TENTH ANNUAL REPORT

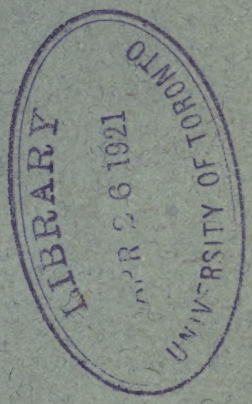
OF THE

Canadian Seed Growers' Association

FOR THE

YEAR ENDING MARCH 31,

1914



Part 1—Minutes of Annual Meeting
Part 11—Addresses and Contributions

OTTAWA
GOVERNMENT PRINTING BUREAU
1914

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PREFATORY STATEMENT

REGARDING THE

CONSTITUTION, OBJECTS AND METHODS OF THE CANADIAN SEED GROWERS' ASSOCIATION.

The Constitution of the Canadian Seed Growers' Association together with the By-laws and Regulations which govern its operations are printed in a special booklet, a copy of which is sent each member and applicant. Since copies of the Annual Reports—of which this is the tenth—are sent to many persons who are not members and who may not know what the Association is or what it stands for, it is proposed to give here a brief description of its origin, objects and methods.

Origin of Canadian Seed Growers' Association.

The Canadian Seed Growers' Association is an outgrowth of the Macdonald Seed Grain Competition, which competition began in 1900 and continued for three years, extending over the entire Dominion and including about 1,500 competitors. The object of this Competition was to stimulate an interest in the growing of pure and productive seed throughout Canada and to demonstrate to the farmer the great practical advantages which may accrue from the use of such seed. At the close of the competition the Canadian Seed Growers' Association was organized, with a view to promoting, through organized effort, a continued interest in this question.

Organization.

The officers of the Association consist of a President, three Vice-Presidents, a Secretary and Treasurer, an Executive Council and a Board of Directors consisting of twenty members. The Directors are nominated from the different provinces in Canada, so that the work is entirely national in character and far reaching in influence.

Membership.

The membership is composed of farmers who make the growing of seed a special branch of their farming operations, and who wish to have their seed registered in the Records of the Association at Ottawa in order that they may reap a fuller reward for their labours should they have a quantity of such seed to sell.

Aims.

The aim of the Association is to systematize the work of seed growing so that it may be made so simple and practical that a large number of farmers may become members and producers of high-class seed of known origin, quantity and purity on their own farms from year to year. In this way is created a base of supply of pure seed which, in turn, is multiplied by members under the Association's inspection and control and made available for seed purposes to the buying public.

SYSTEM OF SEED GROWING.

Choice of Variety.

The system of seed growing followed by members of the Association is briefly as follows:—

Having decided upon the crop or crops of which it is proposed to produce seed each year, the member is urged to choose with great care the variety with which to operate. If he is uncertain as to what variety will do best on his farm or which is most practicable for him to grow he is strongly advised to test two or three of the very best known sorts on duplicate plots for a couple of years. The great importance of this cannot be over-estimated as no grower can afford to work with an inferior or unsuitable sort.

Procuring of Foundation Stock.

Having decided upon the variety, the next step is to secure the very best and purest 'Stock Seed' or Registered Seed of that variety. This or its progeny may often be obtained either from an experimental station or from another member who has been operating for a number of years and who has a supply of such seed on hand. Where a pure stock can thus be obtained in the beginning, the work of the new member is reduced immensely as his future concern consists chiefly in keeping the sort pure and in multiplying it under the inspection and direction of the Association. Where a pure foundation stock is not available the grower may proceed to produce such stock from the chosen variety. This is accomplished by operating each year a *special seed plot* from which is annually selected a sufficient quantity of typical heads, panicles, ears or pods to give enough clean seed to sow another plot the following year. This "hand-selected" seed is then *threshed by hand* and every precaution taken to keep it pure. In this way the member is able to have as a base of supply for pure seed each year a special seed plot which he can control in a way which is quite impossible where the crop of a large field has to be taken into consideration.

The seed plot on which is sown the stock seed of the chosen variety should not be smaller than ¼ acre, except in the case of potatoes, field roots and vegetable seeds. The plot should be in a good state of cultivation, well drained, free from weed seeds and should be sown at the regular rate of seeding.

Multiplication of Stock Seed.

After the hand-selected seed has been taken the remaining product of the seed plot and which is known as Elite Stock Seed, may be carefully threshed and kept separate for multiplying on a special field (multiplying field) the following year.

Production of Registered Seed.

Seed which is grown and handled by members in accordance with the regulations of the Association may be registered in the Records of the Association as *Registered Seed* and certificates of registration may be issued for such quantities of this seed as may be offered for sale.

Seed Catalogue.

The Association issues a catalogue early each winter containing the names of those who are offering Registered Seed for sale, also the names of the sorts offered and the prices asked. In this way the grower and buyer are brought into communication with each other and a careful distribution of Registered Seed thus facilitated.

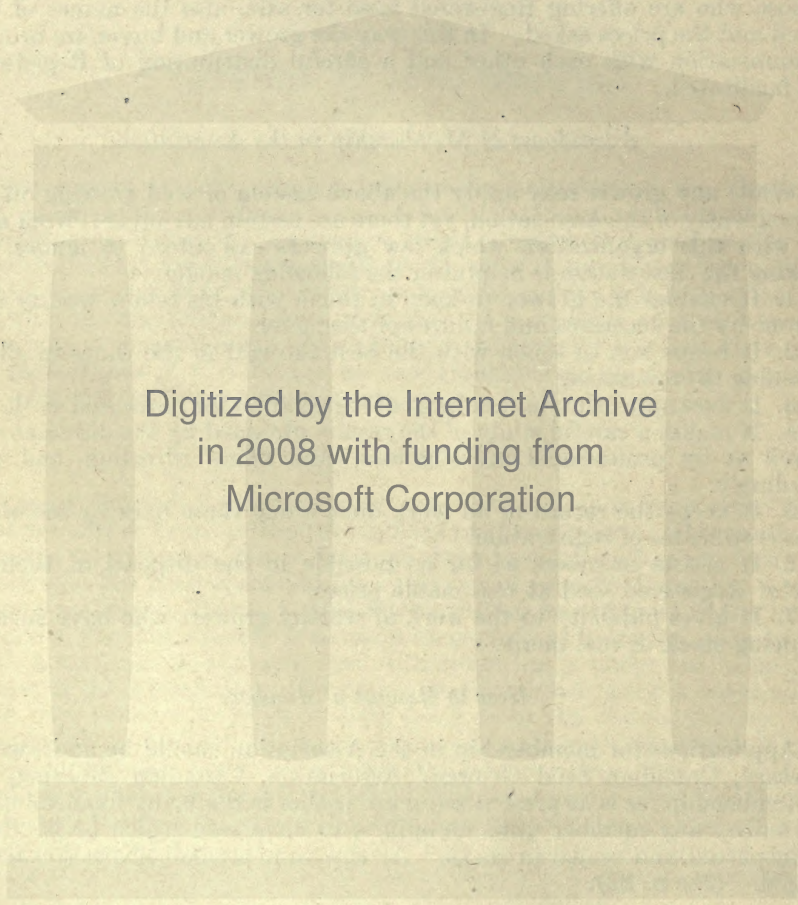
Advantages of Membership in the Association.

While any grower may apply the above system of seed growing on his farm independently of the Association, yet there are certain advantages from an affiliation with this organization which few growers can afford to ignore. Briefly speaking the Association is helpful in the following matters:—

1. It enables the grower to keep in touch with his fellow worker and thus to profit by the successes and failures of the latter.
2. It keeps him in touch with the best thought of the times in all matters pertaining to crop raising.
3. It fixes approximate standards of registration for pure-bred seed.
4. It makes a careful study of the results obtained by the different members as well as by professional investigators, and offers direction and guidance accordingly.
5. It keeps the record of all work done along these lines by members, and issues certificates of registration.
6. It assists members as far as possible in the disposal of their surplus stock of Registered seed at reasonable prices.
7. It gives publicity to the work of worthy growers who have succeeded in producing stock of real merit.

How to Become a Member.

Applications for membership in the Association should be addressed to the Secretary, Canadian Seed Growers' Association, Canadian Building, Ottawa. No membership fee is at present required neither is there any financial obligation incurred by any member until he applies to have seed which he is offering for sale inspected and sealed in sacks. At this time a small inspection fee will be charged. (See p. 22).



CANADIAN SEED GROWERS' ASSOCIATION.

HEAD OFFICE: CANADIAN BUILDING, OTTAWA, ONT.

OFFICERS, 1914-15.

President.—James W. Robertson, C.M.G., Ottawa, Ont.

Vice-Presidents.—Prof. C. A. Zavitz, Guelph, Ont.; G. A. Gigault, Deputy Minister of Agriculture, Quebec; John Mooney, Regina, Sask.

Secretary and Treasurer.—L. H. Newnam, B.S.A., Canadian Building, Ottawa, Ont.

Executive Council.—Dr. Jas. W. Robertson; L. H. Newman; Prof. C. A. Zavitz; G. A. Gigault; Prof L. S. Klinck, Macdonald College, Que.; Prof. W. J. Black, Agricultural College, Winnipeg, Man.; Prof. M. Cumming, Agircultural College, Truro, N.S.

Directors.—Prof. C. A. Zavitz; Prof. L. S. Klinck; Prof. L. A. Moorhouse, Manitoba Agricultural College, Winnipeg, Man.; Prof. John Bracken, Agricultural College, Saskatoon, Sask.; Prof. M. Cumming; A. E. Howes, Vermilion, Alta.; William Palmer, Scotch Lake, N.B.; Narcisse Savoie, St. Anne de la Pocatiere, P. Q.; J. O. Duke, Ruthven, Ont.; William McGregor, Lot 16, P.E.I.; Prof. W. J. Black; G. A. Gigault; F. W. Hodson, Myrtle, Ont.; M. A. McLeod, Sussex, N.B.; John Mooney, Regina, Sask.; W. Scott, Deputy Minister of Agriculture, Victoria, B.C.; W. L. McFarlane, Fox Harbour Pt., N.S.; Geo. Harcourt, Deputy Minister of Agriculture, Edmonton Alta.; Theodore Ross, Charlottetown, P. E. I.; A. Austin, Kamloops, B.C.

Auditors.—L. S. Klinck, Macdonald College, Que.; Accountant, Department of Agriculture, Ottawa, Ont.

CANADIAN SEED GROWERS' ASSOCIATION.

LIST OF OPERATING MEMBERS, 1913-14.

The following list gives the names and addresses of those from whom reports were received for 1913, together with the kinds and varieties of crops with which they are operating, and the number of years the seed is known to have been selected:—

WHEAT.

Alberta.

Anderson, Anton, Handhills, Sec. 19, Tp. 29, R. 16, W. 4th Mer.; Marquis, 1 year.
Arnestad Bros., Stavely, Sec. 28, Tp. 14, R. 26, W. 4th Mer.; Marquis, 1 year.
Blackwood, Alex. S., De Winton, Sec. 24, Tp. 21, R. 29, W. 4th Mer.; Marquis, 1 year.
Hess, W. H., Oyen, Sec. 6, Tp. 23, R. 4, W. 4th, Mer.; Marquis, 1 year.
McAllister, Robt., Taber, Sec., 20, Tp. 13, R. 17, W. 4th Mer.; Red Fife, 9 years.
Nichols, S. S., Three Hills, Sec. 36, Tp. 31, R. 24, W. 4th Mer.; Marquis, 3 years.
Perry, A., Cardston, Sec. 31, Tp. 2, R. 25, W. 4th Mer.; Red Cross, 4 years.
Perry, A. D., Talbot, Sec. 6, Tp. 38, R. 9, W. 4th Mer.; Marquis, 2 years.
Rollis, Rufus J., Three Hills, Sec. 25, Tp. 31, R. 25, W. 4th Mer.; Red Fife, 7 years.
Warner, P. O., Winnifred, Sec. 14, Tp. 12, R. 9, W. 4th Mer.; Marquis, 3 years.

Saskatchewan.

Black, W. M., Creelman, Sec., 9, Tp. 10, R. 10, W. 2nd Mer.; Red Fife, 9 years.
Brown, Jas., Arcola, Sec. 25, Tp. 7, R. 5, W. 2nd Mer.; Red Fife, 5 years.
Carter, R. H., Fort Qu'Appelle, Sec. 17, Tp. 21, R. 14, W. 2nd Mer.; Marquis, 1 year.
Clark, Robert, New Ottawa, Sec. 32, Tp. 43, R. 11, W. 3rd Mer.; Prelude, 2 years.
Coupland, John W., Palmer, Sec. 15, Tp. 12, R. 3, W. 3rd Mer.; Marquis, 1 year.
Dash, F. J., Hillesden, Sec. 22, Tp. 15, R. 6, W. 2nd Mer.; Red Fife, 13 years.
Dash, F. J., Hillesden, Sec. 22, Tp. 15, R. 6, W. 2nd Mer.; Marquis, 3 years.
Dunn, G. H., Kindersley, Sec. 10, Tp. 26, R. 23, W. 3rd Mer.; Marquis, 2 years.
Ellett, Jesse Robt., Lanigan, Sec. 21, Tp. 35, R. 22, W. 2nd Mer.; Early Red Fife, 2 years.
Floyd, M. P., Marshall, Sec. 10, Tp. 48, R. 27, W. 3rd Mer.; Marquis, 1 year.
Genge, Chas., Marquis, Sec. 27, Tp. 19, R. 27, W. 2nd Mer.; Marquis, 3 years.
George, Jas. F., LeRoss, Sec. 11, Tp. 30, R. 24, W. 2nd Mer.; Marquis, 2 years.
Gerlach, Paul, Allan, Sec. 28, Tp. 32, R. 1, W. 3rd Mer.; Marquis, 2 years.
Hall, W. J. G., Blucher, Sec. 12, Tp. 36, R. 2, W. 3rd Mer.; Red Fife, 10 years.
Heryett, Saml. L., New Ottawa, Sec. 30, Tp. 43, R. 11, W. 3rd Mer.; Marquis, 2 years.
Hill, S., Carnduff, Sec. 24, Tp. 1, R. 33, W. P. Mer.; Red Fife, 5 years.
Ind, Fred., Lloydminster, Sec. 22, Tp. 50, R. 27, W. 3rd Mer.; Marquis.

Isaac Bros., Aberdeen, Sec. 14, Tp. 39, R. 3, W. 3rd Mer.; Red Fife, 5 years.
Johnson, R. M., Eastview, Sec. 28 & 29, Tp. 17, R. 24, W. 2nd Mer.; Marquis, 3 years.
Kirkpatrick, W. A., Saskatoon, Sec. 16, Tp. 36, R. 6, W. 3rd Mer.; Marquis, 1 year.
Kohler, E., Wilcox, Sec. S. ½ 5 & N. ½ 32, Tp. 13, 14, R. 20, W. 2nd Mer.; Marquis, 2 years.
Lang, W. D., Indian Head, Sec. 29, Tp. 18, R. 12, W. 2nd Mer.; Marquis.
Lintott, Chas. M., Raymore, Sec. 18, Tp. 28, R. 18, W. 2nd Mer.; Marquis, 4 years.
Pain, W. A., Howell, Sec. 14, Tp. 38, R. 28, W. 2nd Mer.; Marquis, 2 years.
Parsons, R., Glenavon, Sec. 26, Tp. 14, R. 9, W. 2nd Mer.; Marquis, 3 years.
Ramsay, Wm. L. & Son, Bladworth, Sec. 2, Tp. 27, R. 1. W. 3rd Mer.; Marquis, 4 years.
Rowbottom, F. E. K., Fartown, Sec. 2, Tp. 48, R. 27, W. 3rd Mer.; Red Fife, 4 years.
Rowbottom, F. E. K., Fartown, Sec. 2, Tp. 48, R. 27, W. 3rd Mer.; Marquis, 3 years.
Segrave, R. W., Rosetown, Sec. 16, Tp. 30, R. 15, W. 3rd Mer.; Marquis, 2 years.
Shury, F. J., Battleford, Sec. 36, Tp. 42, R. 19, W. 3rd Mer.; Marquis, 2 years.
Simpson, Wm. S., Glenbryan, Sec. 9, Tp. 11, R. 11, W. 3rd Mer.; Marquis.
Spencer, F. N., Craik, Sec. 1, Tp. 24, R. 28, W. 2nd Mer., Red Fife, 8 years.
Wheeler, Seager, Rosthern, Sec. 3, T.p 43, R. 3, W. 3rd Mer.; Preston, 6 years.
Wheeler, Seager, Rosthern, Sec. 3, Tp. 43, R. 3, W. 3rd Mer.; Marquis, 3 years.
Wood & Ibbetson, Bladworth, Sec. 6, Tp. 29, R. 1, W. 3rd Mer.; Marquis, 2 years.

Manitoba.

Atkin, Albert, Melita, Sec. 20, Tp. 2, R. 26, W. 1st Mer.; Marquis, 1 year.
Bedford, Mrs. E., Morden, Sec. 6, Tp. 2, R. 5, W. P. Mer.; Red Fife, 4 years.
Brownlee, D. J., Sinclair Station, Sec. 9, Tp. 7, R. 28, W. 1st Mer.; Marquis, 2 years.
Cunningham, H. C., Hayfield, Sec. 20, Tp. 8, R. 19, W. P. Mer.; Red Fife, 4 years.
Dow Bros., Gilbert Plains, Sec. 9, Tp. 25, R. 22, W. P. Mer.; Red Fife, 11 years.
Grogan, Wm. T., Treherne, Sec. 11, Tp. 8, R. 10, W. P. Mer.; Marquis, 3 years.
McVicar, Donald, Portage la Prairie, Sec. 10, Tp. 12, R. 7, W. 2nd Mer.; Marquis, 2 years.
Price, A. W., Gilbert Plains, Sec. 1, Tp. 26, R. 22, W. 1st Mer.; Marquis.
Smith, J. C., Darlingford, Sec. 17, Tp. 2, R. 7, W. P. Mer.; Red Fife, 7 years.
Wiener, John, Miami, Sec. 3, Tp. 5, R. 7, W. P. Mer.; Red Fife, 6 years.

Ontario.

Carmichael, Duncan, West Lorne, Elgin Co.; Dawson's Golden Chaff, 11 years.
Davidson, Herbert, Milton, Halton Co.; Early Red Clawson, 7 years.
Leadley, R., Barrie, Simcoe Co.; Dawson's Golden Chaff, 12 years.
McKay, Robt., Maxville, Glengarry, Co.; Red Fife 4 years.
Murray, J. T., Arkona, Middlesex Co.; Dawson's Golden Chaff, 11 years.
Shiefele, A. W., Heidelberg, Waterloo Co.; Dawson's Golden Chaff, 13 years.

Quebec.

Levasseur, Jeremie, St. Ulric, Matane Co.; Campbell's White Chaff, 14 years.
Morin, Georges E., St. Hyacinthe, St. Hyacinthe Co.; Red Fife, 2 years.
Morin, Horace, St. Hyacinthe, St. Hyacinthe Co.; Red Fife, 3 years.
Perron, Jos., Les Eboulements, Charlevoix Co.; Perron, 14 years.
Tardif, Laurent, St. Germain, Kamouraska Co.; Preston,4 years.

New Brunswick.

Innes, Donald, Tobique River, Victoria Co.; White Fife, 14 years.

Nova Scotia.

Chisholm, Ronald, Antigonish, Antigonish Co.; White Russian, 8 years.
Mackay, Robert D., Balmoral Mills, Colchester, Co.; Red Fife 7 years.
MacKay, James H., Millsville, Pictou Co.; Red Fife, 14 years.
Murray, John W., Balmoral Mills, Colchester Co.; Red Fife, 4 years.
Oulton, W. G., Lorneville, Cumberland Co.; White Fife, 11 years.

Prince Edward Island.

Arsenault, Elie E., Urbinville, Prince Co.; White Russian, 8 years.
Creed, Richard, Albion, Kings Co.; White Russian, 7 years.
Howatt, Eliphalet, French River, Queen's Co.; Banner, 2 years.
MacFadyen, Ed.; Augustine Cove, Prince Co.; White Fife, 11 years.
Murphy, James E., Augustine Cove, Prince Co.; White Russian, 11 years.
Waugh, Thos., North Bedeque, Prince Co.: White Russian, 14 years.
Wigginton, T. J., Bridgetown, Kings Co.; White Russian, 14 years.

OATS.

Alberta.

Arnestad Bros., Staveley, Sec. 28, Tp. 14, R. 26, W. 4th Mer.; Abundance, 1 year.
Hess, W. H., Oyen, Sec. 6, Tp. 23, R. 4, W. 4th Mer.; Banner, 10 years.
McDonnell, A. W., Lougheed, Sec. 26, Tp. 43, R. 11, W. 4th Mer.; Banner, 10 years.
Rollis, Rufus, J., Three Hills, Sec. 25, Tp. 31, R. 25, W. 4th Mer.; Banner, 7 years.

Saskatchewan.

Calcraft, T. W., Belvoir, Sec. 6, Tp. 28, R. 16, W. 3rd Mer.; Banner, 1 year.
Carey, W. E., Buffalo Plains, Sec. 14, Tp. 12, R. 10, W. 2nd Mer.; Banner, 9 years.
Carter, R. H., Fort Qu'Appelle, Sec. 17, Tp. 21, R. 14, W. 2nd Mer.; Abundance, 6 years.
Dunn, G. H., Kindersley, Sec. 10, Tp. 26, R. 23, W. 3rd Mer.; Banner, 10 years.
Ellett, Jesse, Robt., Lanigan, Sec. 21, Tp. 48, R. 22, W. 2nd Mer.; Abundance, 1 year.
Fitzgerald, G. D., Grenfell, Sec. 9, Tp. 16, R. 17, W. 2nd Mer.; Ligowo, 1 year.
Kohler, E., Wilcox, Sec. S ½ 5 and N. ½ 32, Tp. 13, 14, R. 20, W. 2nd Mer.; Banner, 9 years.
Lanigan, J. J., Elfros, Sec. 24, Tp. 33, R. 14, W. 2nd Mer.; Abundance, 1 year.
Mooney Seed Co., Regina, Sec. 28, Tp. 36, R. 5, W. 3rd Mer.; Banner.

Ramsay, Wm. L. & Son, Bladworth, Sec. 30, Tp. 27, R. 1, W. 3rd Mer.; Banner, 9 years.
Rowbottom, F. E. K., Fartown, Sec. 2, Tp. 48, R. 27, W. 3rd Mer.; Abundance, 3 years.
Russell, Alex. W., Forget, Sec. 16, Tp. 7, R. 6, W. 2nd Mer.; Banner, 11 years.
Shury, F. J., Battleford, Sec. 36, Tp. 42, R. 19, W. 3rd Mer.; Banner, 10 years.
Simpson, Wm. S., Glenbryan, Sec. 9, Tp. 11, R. 11, W. 3rd Mer.; Banner, 10 years.
Wheeler, Seager, Rosthern, Sec. 3, Tp. 43, R. 3, W. 3rd Mer.; Victory, 2 years.
Whiting, Frank J., Traynor, Sec. 36, Tp. 38, R. 18, W. 3rd Mer.; Banner, 10 years.

Manitoba.

Dow Bros., Gilbert Plains, Sec. 9, Tp. 25, R. 22, W. P. Mer.; Banner, 13 years.
Dunn, Wm., Miami, Sec. 33, Tp. 5, R. 6, W. 2nd Mer.; Banner, 3 years.

Ontario.

Airth, John M., Renfrew, Renfrew Co.; Banner, 2 years.
Boyce, Geo., Merivale, Carleton Co.; Banner, 13 years.
Brownlee, Wesley, North Gower, Carleton Co.; Banner, 12 years.
Carmichael, Duncan, West Lorne, Elgin Co.; White Lothian, 6 years.
Chalmers, Harry, Smith's Falls, Lanark Co.; Banner, 7 years.
Dixon, W. L., R.R. No. 1, Varney, Grey Co.; Banner, 13 years.
Ewing, W. L., Orangeville, Dufferin Co.; Abundance, 1 year.
Ferguson, James, Dalmeny, Carleton Co.; Banner, 1 year.
Foyston, Fred., Minesing, Simcoe Co.; O.A.C. No. 72, 2 years.
Free, Wm. H., Strathnairn, Grey Co.; Sensation, 5 years.
Goltz, Herman, Bardsville, Muskoka Co.; Imported Scotch, 5 years.
Hodson, F. W., Myrtle, Ontario Co.; Siberian, 4 years.
Hunter, Hugh, Wyoming, Lambton Co.; Banner, 10 years.
Hutchinson, Alfred, Mount Forest, Wellington Co.; O.A.C. No. 72, 1 year.
Lewis, David, Dunsford, Victoria Co.; Siberian, 6 years.
Livingstone, Lloyd, Minesing, Simcoe Co.; O.A.C. No. 72, 1 year.
Maccoll, Arch., Aldboro, Elgin Co.; Ligowo, 5 years.
Putman, H. A. & Son, Silverdale, Lincoln Co.; Victory, 1 year.
Rathwell, Marshall, Navin, Cumberland Co.; Banner, 9 years.
Schmidt, Andrew, Mildmay, Bruce Co.; Sensation, 4 years.
Schiefele, A. W., Heidelberg, Waterloo Co.; Daubeney, 5 years.
Slater, J. A., Galt, Waterloo Co.; Siberian, 2 years.
Stark, J. H., Lang, Peterborough Co.; Banner, 9 years.
Taylor, Garnet S., Wellington, Prince Edward Dist. O.A.C. No. 72, 1 year.
Walker, Fletcher, Royston, Parry Sound Co.; Banner, 1 year.
Wilson, Peter, Cobden, Renfrew Co.; Banner, 9 years.

Quebec.

Couture, Joseph, Lorette, Quebec Co.; Banner, 7 years.
Green, Henry C., Coaticook, Stanstead Co.; Banner, 6 years.
Labrie, Louis, Beausejour, Rimouski Co.; Banner, 10 years.
Levasseur, Jeremie, St. Ulric, Matane Co.; Tartar King, 8 years.
Levasseur, Jeremie, St. Ulric, Matane Co.; Gold Rain, 3 years.
Morin, Cyrille, St. Hyacinthe, St. Hyacinthe Co.; Banner, 9 years.
Morin, Horace, St. Hyacinthe, St. Hyacinthe Co.; Banner, 4 years.
Pintal, Gustave, Champlain, Champlain Co.; Banner, 7 years.
Robertal, David, Cap Rouge, Quebec Co. Banner, 2 years.
Simard, Juste, Bai St. Paul, Charlevoix Co.; Banner, 10 years.
Tardif, Laurent, St. Germain, Kamouraska Co.; Banner, 4 years.

New Brunswick.

Hastings, Chas., Murray Road, Westmorland Co.; Old Island Black, 6 years.
Innes, Donald, Tobique River, Victoria Co.; Early Blossom, 14 years.
Palmer, Wm. E., Scotch Lake, York Co.; Banner, 13 years.
Smith, Clarence B., Blissville, Sunbury Co., Banner, 4 years.

Nova Scotia.

Brown, Harry, Wallace Bay, Cumberland Co.; Banner, 10 years.
Chisholm, Ronald, Antigonish, Antigonish Co.; Banner, 8 years.
Kaulbeck, Robt., Mid. Musquodoboit, Halifax Co.; Banner, 5 years.
MacFarlane, W. L., Fox Harbour, Cumberland Co.; Banner, 8 years.
MacKay, Robert, Balmoral Mills, Colchester Co.; Banner, 7 years.
Oulton, W. G., Lorneville, Cumberland Co.; Abundance.

Prince Edward Island.

Arsenault, Elie E., Urbinville, Prince Co.; Old Island Black, 6 years.
Arsenault, Elie E., Urbinville, Prince Co.; Banner, 4 years.
Creed, Richard, Albion, Kings Co.; Banner, 10 years.
Marchbank, Jas., New Annan, Prince Co.; Banner, 14 years.
McLean, A. E., South West Lot 16, Prince Co.; Banner, 8 years.
McKenna, Michael, Newton, Prince Co.; Banner, 14 years.
McGregor, W. H., Miscouche, Lot 16, Prince Co.; Banner, 12 years.
Millman, J. Bradford, Long River, Queens Co.; Banner, 7 years.
Murphy, James E., Augustine Cove, Prince Co.; Banner, 4 years.
Rodd, Amos, North Milton, Queens Co.; Banner.
Rodd, Ira L., North Milton, Queens Co.; Banner.
Waugh, Thos., S., North Bedeque, Prince Co.; Banner, 11 years.
Wigginton, T. J., Bridgetown, Kings Co.; Ligowo, 2 years.

BARLEY.*

Alberta.

Perry, A. D., Talbot, Sec. 6, Tp. 38, R. 9, 4th Mer.; O.A.C. No. 21, 2 years.

Saskatchewan.

Carter, R. H., Fort Qu'Appelle, Sec. 17, Tp. 21, R. 14, W. 2nd Mer.; Eclipse, 6 years.
Carter, R. H., Fort Qu'Appelle, Sec. 17, Tp. 21, R. 14, W. 2nd Mer.; Manchurian, 1 year.
Hall, W. J. G., Blucher, Sec. 12, Tp. 36, R. 2, W. 3rd Mer.; O.A.C. No. 21, 1 year.
Ramsay, Wm. L., & Son, Bladworth, Sec. 30, Tp. 27, R. 1, W. 3rd Mer.; O.A.C. No. 21, 5 years.
Wheeler, Seager, Rosthern, Sec. 3, Tp. 43, R. 3, W. 3rd Mer.; O.A.C. No. 21, 2 years.
Wheeler, Seager, Rosthern, Sec. 3, Tp. 43, R. 3, W. 3rd Mer.; Canadian Thorpe, 3 years.

*The barley sort known as "O.A.C. No. 21" is a pure strain (originating from a single plant) selected and first introduced by Prof. C. A. Zavitz, O.A.C., Guelph, Ont.

Ontario.

Crosby, R. H., Markham, York Co.; O.A.C. No. 21, 4 years.
Carmichael, Duncan, West Lorne, Elgin Co.; Mandscheuri, 9 years.
Hutchinson, Alfred, Mount Forest, Wellington Co.; O.A.C. No. 21.
Klopp, Oscar, Zurich, Huron Co.; O.A.C. No. 21, 1 year.
Livingston, Lloyd, Minesing, Simcoe Co.; O.A.C. No. 21, 5 years.
Maccoll, Arch., Aldboro, Elgin Co.; O.A.C No. 21, 3 years.
Northcott, S. A., Taunton, Durham Co.; O.A.C. No. 21, 4 years.
Partridge, A. W., Barrie, Simcoe Co.; O.A.C No. 21, 3 years.
Schmidt, Andrew, Mildmay, Bruce Co.; O.A.C. No. 21, 4 years.
Stark, J. H., Lang, Peterborough Co.; O.A.C. No. 21, 4 years.
Schiefele, A. W., Heidelberg, Waterloo Co.; Mandscheuri, 7 years.
Van Sickle, P. O., Alberton, Wentworth Co.; O.A.C. No. 21.
Webster, H. B., Rannoch, Perth Co.; O.A.C. No. 21, 3 years.

Nova Scotia.

MacKay, James H., Millsville, Pictou Co.; Mensury, 7 years.

Prince Edward Island.

Waugh, Thos. S., North Bedeque, Prince Co.; O.A.C. No. 21, 3 years.
Wigginton, T. J., Bridgetown, Kings Co.; Mensury, 6 years.

Indian Corn.

Ontario.

Carmichael, Duncan, West Lorne, Elgin Co.; Wisconsin No. 7.
Coatsworth, J. H., Ruthven, Essex Co.; Yellow Dent (Hybrid) 6 years.
Cohoe, Blake, South Woodslee, Essex Co.; White Cap Yellow Dent, 1 year.
Cohoe, Blake, South Woodslee, Essex Co.; Wisconsin No. 7, 2 years.
Duke, J. O., Olinda, Essex Co.; White Cap Yellow Dent, 1 year.
Hankinson, L. D., Grovesend, Elgin Co.; Longfellow, 8 years.
Hunter, Hugh, Wyoming, Lambton Co.; White Cap Yellow Dent, 5 years.
Maccoll, Arch., Aldboro, Elgin Co.; Compton's Early, 3 years.
Maccoll, Arch., Aldboro, Elgin Co.; Longfellow, 3 years.
Martin, Jas., Amherstburg, Essex Co.; Wisconsin No. 7, 1 year.
Maynard, A. S., Chatham, Kent Co.; North Dakota (White Flint) 3 years.
McKee, Jno., Norwich, Oxford Co.; Stowell's Evergreen, 6 years.
Mullins, Ed., J., Woodslee, Essex Co.; Winsconsin No. 7, 2 years.
Ouellette, Alvin, Walkerville, Essex Co.; Wisconsin No. 7, 1 year.
Parks, John, Amherstburg, Essex Co.; Wisconsin No. 7, 2 years.
Patton, F. W. & Sons, Amherstburg, Essex Co.; Wisconsin No. 7.
Pearce, Jno. P., Staples, Essex Co.; Leaming, 6 years.
Pearce, S. M., Iona, Elgin Co.; White Cap Yellow Dent, 1 year.
Shepley, T. J., Amherstburg, Essex Co.; Wisconsin No. 7, 3 years.
Sovereign, L. A., Round Plains, Norfolk Co.; Early Crosby, 5 years.
Soverign, L. A., Round Plains, Norfolk Co.; Early Evergreen, 3 years.
Sovereign, L. A., Round Plains, Norfolk Co.; Old Colony, 2 years.
Smith, F. A., Grovesend, Elgin Co ; Bailey, 3 years.
Smith, F. A., Grovesend, Elgin Co.; Stowell's Evergreen, 2 years.
Smith, F. A., Grovesend, Elgin Co.; Crowfoot, 2 years.
Smith, F. A., Grovesend, Elgin Co.; Gold Nugget, 2 years.

Thompson, Robert, St. Catherines, Lincoln Co.; North Dakota (White Flint) 5 years.
Totten, Kenneth, South Woodslee, Essex Co.; Wisconsin No. 7, 2 years.
Totten, Thomas, South Woodslee, Essex Co.; Wisconsin No. 7, 2 years.
Warwick, Edward, Guilds, Kent Co.; North Dakota (White Flint) 1 year.
Waugh, Jas. S., Chatham, Kent Co.; Longfellow, 4 years.
Wilson, R. J., Charing Cross, Kent Co.; Wisconsin No. 7, 2 years.

Quebec.

Reid, Benjamin, Ulverton, Drummond Co.; Quebec Yellow, 4 years.

Nova Scotia.

Chute, Manning, Berwick, Kings Co.; Native Yellow, 5 years.

PEAS.

Ontario.

Airth, John M., Renfrew, Renfrew Co.; Arthur, 2 years.

New Brunswick.

Innes, Donald, Tobique River, Victoria Co.; White Marrowfat, 9 years.

POTATOES.

Saskatchewan.

Hall, W. J. G., Blucher, Sec. 12, Tp. 36, R. 2, W. 3rd Mer.; Carman No. 1, 4 years.
Turner, H. E., Duval, Sec. 4, Tp. 26, R. 21, W. 2nd Mer.; Irish Cobbler, 4 years.
Waters, W., Nutana, Sec. 36, Tp. 34, R. 5, W. 3rd Mer.; Vermont Gold Coin, 2 years.
Waters, W., Nutana, Sec. 36, Tp. 34, R. 5, W. 3rd Mer.; Rochester Rose, 2 years.
Wheeler, Seager, Rosthern, Sec. 3, Tp. 43, R. 3, W. 3rd Mer.; Beauty of Hebron, 4 years.

Ontario.

Crosby, R. H., Markham, York Co.; Delaware, 4 years.
Goltz, Herman L., Bardsville, Muskoka District; Green Mountain, 1 year.
Goltz, Herman L., Bardsville, Muskoka District; Empire State, 4 years.
Goltz, Herman L., Bardsville, Muskoka District; Early Rose, 4 years.
Hutchinson, Alfred, Mount Forest, Wellington Co.; Empire State, 7 years.
Hutchinson, Alfred, Mount Forest, Wellington Co.; Rural New Yorker, 1 year.
Lamont, Alex., Mount Brydges, Middlesex Co.; Davies Warrior, 1 year.
McKee, Jas. H., Whitfield, Dufferin Co.; Gold Coin, 1 year.
Martyn, E. H., Port Hope, Durham Co.; Empire State.
Naismith, Wm., Falkenberg, Muskoka District; Empire State, 3 years.
Naismith, Wm., Falkenberg, Muskoka District; Rochester Rose, 2 years.
Naismith, Wm., Falkenberg, Muskoka District; Canadian Standard, 3 years.
Richardson, J. E., Wallaceburg, Kent Co.; Carman No. 1, 5 years.
Roberts, J. H., Earlton, Nipissing District; Early Eureka, 3 years.

Schmidt, Andrew, Mildmay, Bruce Co.; Early Sensation, 2 years.
Walker, Fletcher, Royston, Parry Sound District; Empire State, 1 year.
Walker, Fletcher, Royston, Parry Sound District; Rochester Rose, 1 year.

New Brunswick.

Fawcett, C. Fred., Upper Sackville, Westmorland Co.; Green Mountain, 5 yers.
Fawcett, C. Fred, Upper Sackville, Westmorland Co.; Irish Cobbler, 4 years.
Leger, Emile, Memramcook, Westmorland Co.; Green Mountain, 4 years.
Palmer, Wm. E., Scotch Lake, York Co.; Irish Cobbler, 3 years.
Palmer, Wm. E., Scotch Lake, York Co.; Delaware, 3 years.
Parlee, Harvey B., Sussex, Kings Co.; Early Ensign, 2 years.
Parlee, Harvey B., Sussex, Kings Co.; Pearl of Savoy, 2 years.
Parlee, Harvey B., Sussex, Kings Co.; Irish Cobbler, 2 years.
Parlee, Harvey B., Sussex, Kings Co.; Bliss' Early Triumph, 2 years.
Parlee, Harvey B., Sussex, Kings Co.; Delaware, 2 years.

Nova Scotia.

Brown, Harry, Wallace Bay, Cumberland Co.; Green Mountain, 8 years.
McNeil, Dan C., Brophys, Antigonish Co.; Dreer's Standard, 3 years.

Prince Edward Island.

Millman, James B., Long River, Queens Co.; Green Mountain, 2 years.

FLAX.

Saskatchewan.

Dunn, G. H., Kindersley, Sec. 10, Tp. 26, R. 23, W. 3rd Mer.; Premost, 2 years.

Manitoba.

Dunn, Wm., Miami, Sec. 33, Tp. 5, R. 6, W. 2nd Mer,; Premost, 2 years.

APPLICANTS—1913–14.

Those who have applied for membership (not including those in seed centres) but who are not yet entitled to such recognition are indicated in the following table:—

	Mar. Dist.	Que.	Ont.	Man.	Sask.	Alta. & B.C.	Total.
Seed wheat growers	31	3	21	15	71	39	180
Seed oat growers	64	13	60	6	39	14	196
Seed barley growers	5	1	22	5	13	13	59
Growers of seed corn	6	2	35	2	1	1	47
Growers of seed potatoes	20	7	41	1	8	15	92
Applicants not yet specifying crops	1	0	11	1	1	3	17
Growers of seeds of miscellaneous crops, such as beans, peas, etc	6	5	41	0	11	2	65
Total	133	31	231	30	144	87	656

Since some of the growers indicated in the above table operate with more than one class of crop, a further analysis is necessary in order to show the exact number of persons actually engaged in the work. The following statement indicates the standing of the Association in this regard:—

Summary.

Total number on application list before revision	551		
Number of applicants removed from list of active operators	88		
Number of applicants removed to membership list	62		
Number of applicants remaining on list			401
Number of growers in all (54) seed centres			414
Number of old members reporting satisfactorily		117	
Number of members failing to make satisfactory selections	80		
Number of old members dropping the work	20	60	
Number of new members reporting satisfactorily		62	
Total number of individual members in full standing			239
Total number affiliated with the Association			1,054

PART I.

MINUTES OF THE TENTH ANNUAL MEETING OF THE CANADIAN SEED GROWERS' ASSOCIATION.

EVENING SESSION, MARCH 5, 1914.

The Tenth Annual Meeting of the Canadian Seed Growers' Association held its opening session in the Railway Committee Room of the House of Commons, Ottawa, on the evening of March 5, 1914. The President, Dr. Jas. W. Robertson, occupied the chair, and delivered the presidential address.

(For this address, see page 37).

The PRESIDENT:—We will now have Prof. Zavitz' paper on "The Production of Alfalfa Seed in Canada." I need not detain you a moment beyond saying that if ever an association had a foster father that did all the fostering and all the fathering needed, then this Association has such in our friend Zavitz. (Applause).

(For Prof. Zavitz' paper, see page 41).

The PRESIDENT:—I am sure we have listened with much pleasure and profit to this most excellent paper on this wonderful plant. The discussion on Prof. Zavitz' paper will be opened by Dr. M. O. Malte.

(For this discussion, see page 45).

The PRESIDENT:—I would like to express for you to Dr. Malte our appreciation of his contribution. If by selection we can realize in those directions which he indicated, alfalfa growing will become a much more common practice and a much more profitable means of producing feed for our cattle and horses and swine and poultry.

The next paper is entitled "What Can the Rural School do to Promote an Active Interest in the Production of Pure Seed in Canada?" This paper will be presented by Prof. S. B. McCready, of the Department of Education, Toronto.

(For this paper, together with the discussion thereon, see page 48).

The PRESIDENT:—I am sure no more fruitful field is open than that for the closest possible co-ordination and co-operation between the grown people in their work in the country and those who are growing up into responsibilities in the rural schools; and I congratulate Professor McCready on the very noticeable and excellent progress made within the last three years in this respect in the rural schools of Ontario.

The Directors will meet in the Carnegie Library hall at 9.30 to-morrow morning, and the regular session of the Association will begin at 10 o'clock in the same hall. This meeting is now adjourned.

MORNING SESSION, MARCH 6, 1914.

The meeting was called to order by the President at 10 a.m.

The minutes of the last annual meeting, having been printed and in the hands of the members for several months, were taken as read and adopted.

The report of the Board of Directors was then presented.

REPORT OF THE BOARD OF DIRECTORS

(Presented by the Secretary.)

MR. PRESIDENT AND GENTLEMEN: Your Directors beg to submit herewith their tenth Annual Report on the general progress of the work of the Association for the past year. The present status of the Association as regards membership together with other matters of detail will be submitted in the report of the Secretary. It is with great pleasure that we are able to report a year of activity and substantial progress. At the last meeting of this Association it was agreed that the Association should pursue a more active policy designed to increase the supply of Registered seed in Canada. To this end the organization of local seed-growing centres or associations was recommended. It was also recommended that members of this Association and farmers should organize themselves into co-operative associations with a view to facilitating the selling of seed. In order that the seed-centre plan might more readily meet with success, it was agreed that we shall recognize the principle of local responsibility and initiative and that the Departments of Agriculture of the various provinces throughout Canada should be encouraged to take the initiative in the organization of local seed growing centres and that the responsibility for their success should be laid largely upon a local officer. A resolution was passed authorizing the Executive Council to interview the Departments of Agriculture of the various provinces and to ascertain to what extent they were prepared to take definite action.

On May 21, 1913, representatives of the several Departments of Agriculture were communicated with by letter, in which letter the opportunities for the Provincial officers to render useful service to their constituencies through the production of registered seed in suitable centres were emphasized. It was expected that the organization of these centres would be most easily accomplished in the province of Ontario where the District representative system offered admirable machinery for its execution. Early in July, therefore, communication was held with each district Representative to whom it was explained that any credit which might be forthcoming from the successful prosecution of such work by him would come to him rather than to the Association; that the Association would simply keep in sufficiently close touch with him and the growers under his supervision to be able to keep the records to vouch for the quality, purity and standing of the seed produced and to issue a seed catalogue which would be distributed widely throughout Canada. This wider advertisement and recognition in fact, was advanced as the main advantage which might accrue to individuals by being connected with our Association rather than by operating independently. It was suggested to these men that progress would probably be made most rapidly by organizing what might be called "Seed-growing Centres" in districts known to be specially suited to the production of certain kinds of seed and that each centre should be composed of the best farmers. Assistance in the organization of these centres was offered by the Association as well as by the officers of the Dominion Seed Branch providing this assistance were desired. This offer was accepted by almost every District Representative in the Province who warmly welcomed the scheme as another 'string to his bow,' so to speak, with the result that in Ontario thirty-four centres have been established having a total of 262 members. This does not include a potato-growing centre at Emo, Ont., composed of 92 members. Each of the above 262 members placed an order at the meeting of organization or later for a substantial quantity of registered seed with which to start. Three of these centres were started in the spring of 1913 with a membership of forty. These purchased 148 bushels of seed as foundation stock. The additional 220 growers have placed orders for 1,378 bushels of seed for delivery this spring.

A total of 1,526 bushels of registered seed has therefore been ordered in Ontario to start men in seed centres. The thirty-four centres consist of twenty oat centres, three wheat centres, six potato centres, three barley centres, one corn centre, and one alfalfa centre.

Progress in the organization of these centres has also been made in the other provinces of Canada, notably in Prince Edward Island, Quebec, Saskatchewan, Alberta and British Columbia. In the Maritime Provinces, especially in Prince Edward Island, three Banner oat centres are being organized which may increase the number of growers by about forty.

In Quebec we now have about sixteen centres having a total membership of 112. Eight of these were organized by Mr. J. A. Simard, Representative of the Dominion Seed Branch in the Spring of 1913 with a membership of fifty-three men. The additional eight centres have placed orders for 434 bushels of seed for their fifty-nine members for this spring's delivery.

In Saskatchewan the Weeds and Seed Commissioner is endeavouring to get a number of centres started this spring.

In Alberta the Provincial Department of Agriculture proposes to utilize its seven demonstration farms in the propagation of registered seed, the production of stock seed being in the hands of one or two competent men. The Department of Natural Resources of the C.P.R. also proposes to do something along this line very soon.

In British Columbia a total of 2,079 bushels of registered Banner oats has been ordered by the Provincial Department of Agriculture with a view to getting a start with this work in that province.

Taking all provinces together, fifty-three centres have been established with a total membership of 414. These are receiving a total of 1,970 bushels of registered seed as foundation stock. This does not include the 2,079 bushels going to British Columbia only a part of which will be used to supply new men. In the organization of these centres it is worthy of note that the illustration farmers operating under the direction of the Commission of Conservation have joined in the movement, and each is likely to constitute the nucleus of a centre.

The success which has attended the early efforts of the Executive towards the establishment of these centres is gratifying, and your board has directed the said Executive to promote this work as rapidly as circumstances seem to warrant.

The Executive Council, after careful consideration, believe that since experience has shown that only a small percentage of applicants for membership succeed in growing Elite Stock seed and since many growers who are quite competent to produce high class seed in large quantities have neither the time nor the inclination to operate a hand selected seed plot, it would be desirable to allow each regularly organized Seed Centre to have its stock seed produced by one, or with the consent of the centre and the Executive, more than one of its members rather than by *each* member individually, the other members acting as propagators and securing their stock seed or, first generation registered seed whenever necessary from the special selector. By this arrangement the centre as such might be accepted as a member of our Association. A special committee, consisting of Messrs. Cumming, Zavitz, Klinck, Eddy, Moorhouse and Newman was appointed to look into the matter more carefully and to draft regulations pertaining to the organization of seed centres. The suggested regulations are submitted herewith as follows:—

Regulations Pertaining to Organization of Seed Centres.

In order that regularly authorized bodies of persons as well as individuals may enjoy the rights of merbership, the following is authorized:—

(1) That clause 10 of the constitution which reads as follows : "The Association may admit as members any persons resident in Canada" be changed to read "The Association may admit as members any person or regularly organized body of persons resident in Canada, etc."

(2) That these organized bodies or persons be admitted as members when the following regulations together with such others as the Executive Council may deem necessary, are complied with:—

(a) That these bodies shall be known as *Seed Centres* with such prefixes as may indicate their location and kind of seed grown.

(b) That the aim and object of these Centres shall be the production and sale of registered seed of uniform quality.

(c) That the officers shall consist of a President, a Secretary-Treasurer and three or more Directors to be elected by vote of the members.

(*d*) That the officers and Directors shall constitute the Board of Directors who shall have entire control of the local affairs of the Centre subject always to the general rules and the special directions of the Association.

(*e*) Members may be elected by two-thirds vote of any regular meeting of the centre and must pay into the funds of the Centre an initial fee of $1 and such annual fee as the Centre may consider necessary.

(*f*) The *majority* of the members shall constitute a quorum for any meeting.

(*g*) The area included in any Centre shall not be of greater extent than will enable every member to have easy and frequent access to a seed plot. The Association may define limitations based on the report of the inspector.

(*h*) The Centre shall supply every member each year or as often as is necessary, with the same stock of "Elite Stock" or first generation "Registered Seed." With all crops except wheat, oats and barley, the production of Elite Stock Seed shall be made by *one* member in order to maintain uniformity, but it is recommended that Elite Stock Seed be sown on two or more farms in order to guard against the possibility of any one seed plot being destroyed. With the approval of the Centre more than one grower, in the case of wheat, oats and barley or other self fertilizing class of crop may produce Elite Stock Seed provided that all such growers start with the same foundation stock.

(*i*) The member or members producing Elite Stock Seed shall supply the other members with either Elite Stock or first generation Registered Seed at a price agreed upon by the Centre subject to the seed being accepted for registration by the Association.

(*j*) A Centre may operate with only one *variety* of any kind of crop.

(*k*) All registered seed grown by members of the Centre must be offered for sale *under the name of the Centre* and the registration tag to be attached to the sack by the Inspector must be signed by the Secretary of the Centre.

Up to the present the Association has not asked its members to assume any financial obligation whatsoever in connection with the carrying on of its work, all funds being received from a grant from the Federal Department of Agriculture. Owing to the fact that certain members profit very considerably financially and should therefore be willing to assist to some extent at least in the financial affairs of the Association, your Directors beg to recommend that henceforth fees be paid on seed inspected and sealed in sacks. The following scale of fees is suggested:—

1. For each visit for inspection of seed *grown by members in a regularly organized seed centre* a charge of $1 will be made, applications for inspection being accompanied by the required money.

2. For each visit for inspection of seed not grown by members of a centre *but rather by independent members*, $2 each.

3. Where seed is actually inspected in the sack and the sacks sealed the following additional charge will be made:—

(*a*) For each bushel up to 200 bushels, 2 cents per bushel.

(*b*) Where the quantity exceeds 200 bushels, 1 cent per bushel or, if the member prefers, at the rate of $4 per day for each day the inspector is on the premises.

The matter of standards required for registered seed has been given careful consideration and it is recommended that if any case where wild oats are found in a field of oats intended for registration, the secretary be authorized to decide whether the seed from that field shall be accepted for registration. Similar authority may be exercised in the case of smut in cereals.

We recommend further that growers be not allowed to operate with more than one variety of the same crop, except in the case of potatoes, on the one farm, unless they prove to the satisfaction of the Executive that they are capable of handling more than one type and can maintain the purity of each.

During the past season large quantities of seed intended for registration have had to be rejected on account of deficiencies either in the quality or purity. Every year in fact climatic influences in some districts prevent the seed produced from complying with the standards of quality required for registered seed. This indicates the necessity of having many seed growing centres and of having these widely scattered so that in no year will any serious shortage of good seed be experienced.

The Directors continue to recognize the value of Provincial Seed Fairs when held at suitable and convenient centres and when provided with proper accommodation. In our opinion there is a special need as well as an excellent opportunity at present for such exhibitions in view of the fact that the numerous seed growing centres will need such a medium for advertising their goods.

During the past season special efforts have been put forth to secure for registered seed similar treatment in respect to transportation rates on railways as applies to registered live stock, namely, one-half of the regular tariff rate, and we are pleased to be able to report that on western lines at least, reduced rates will be allowed on this class of seed. We are now endeavouring to secure similar treatment on the lines in Eastern Canada. The granting of these reduced rates will in our opinion be a great impetus to the growing and handling of registered seed in Canada and will tend to increase the quantity enormously.

We commend to the careful consideration of this meeting the question of the choice of directors. We believe that the time has come when the Board should be composed chiefly of men who are recognized plant-breeders or producers of registered seed. We also feel that if the representatives of Provincial Departments of Agriculture are to assume certain responsibilities in connection with the production and inspection of registered seed that each department should be invited to nominate a representative to serve on the Board.

During the year 22,000 English copies and 6,000 French of the Ninth Annual Report have been printed and distributed by the Publications Branch. This increased circulation over former years has brought the Association into greater prominence than ever before, judging from the numerous inquiries for further information which have been received.

It is encouraging to know that these reports are being looked for from year to year with considerable interest by many people. Thus one of our correspondents from Marquis, Sask., writes: "I have been more than delighted by the reports to hand. There has certainly been 'meat and drink' in the variety of

information contained in them and I am confident that if farmers would only carefully read them and follow the suggestions therein contained, that our crops would be improved both in quality and quantity." From another gentleman living in Saskatchewan we have received the following characteristic note:—"I have read with great interest the various articles contained in your Ninth Annual Report on the various methods employed in the production of high class farm seed and I should like to be enrolled as a member in the C.S.G.A. in order that I may become more deeply interested in this great branch of farming."

In several cases the information contained in reports on different subjects has elicited further contributions of value from growers. Thus, in a letter to the secretary, dated April 28, 1914, Mr. C. Genge, of Kindersley, Sask., writes:—

> "I duly received a copy of the Ninth Annual Report of the C.S.G.A., and was particularly interested in the articles on thickness of seeding in cereal grains and in the comparisons between different varieties of oats. With regard to the former, I have found that what was suitable for summer-fallow or back setting would not do for spring or fall ploughing, and that different soils needed different quantities of seed. In 1911 I sowed pure-bred Banner oats at the rate of 9 pecks per acre on a well-worked and mellow summer-fallow, packing behind the drill. I sowed the same oats on a rather low-lying piece of back setting at the rate of 3½ bushels per acre. The oats on the summer-fallow were a heavy crop, but very badly rusted and lodged. They yielded 84 bushels per acre, with considerable waste. The oats on the back setting were equally heavy, but free from rust and strong and stiff in the straw. They yielded 119½ bushels per acre. Another field of oats on fall ploughing, seeded 2 bushels per acre, yielded 70 bushels per acre, and I am sure that heavier sowing would have shortened the straw and lessened the yield. In 1912 a neighbour of mine sowed a piece of summer-fallow with Abundance oats at the rate of 2 bushels per acre. The resulting crop was so badly down and tangled that he had to cut it with a mower. This was in the Moosejaw district and seemed to prove that for oats sown on a well-worked summer-fallow or back setting, 2 bushels per acre is not enough in heavy soil, as the straw of the resulting crop is too weak and sappy to stand up.
>
> "Governmental reports and experimental work generally show that Banner oats are the best general purpose oats for the West. In yield per acre and strength of straw they excel the Abundance. At a seed fair or other competition, however, owing to its better appearance and greater weight per measured bushel, the Abundance oat usually gets the highest score and the sweepstakes, leading many people to think it the better oat, whereas the Banner oat, equally valuable on the market, will produce more profit per acre. Should not this be remedied?
>
> "There is a lot of interest being taken in the work of the Association in this district and several farmers are talking of taking up the work, and as the land here is clean it should make a good centre."

The value of registered seed is becoming recognized more and more with each recurring season, a fact which accounts very largely for the increasing demand for this class of seed. Mr. R. H. Carter, one of our older members, writes:—"I never before had such a showing of crops on my farm as I have this year. The inspector's score cards, together with my success at Tulso, Oklahoma, gives evidence of the value of registered seed." Another grower, writing of his success with carefully selected Marquis wheat writes:—"It weighed out 40 bushels per acre and was a very good sample. This is the first time that I have ever had wheat to do this, and I am sure the seed had a lot to do with it, as I have

had land in better condition but never got these results before." Still another grower writes as follows:—"Without actual experience I could never have believed the difference selected seed makes in a general crop. My Marquis wheat nearly reached 50 bushels per acre, and it is by far the best wheat and the best yield I ever had. Some of this of course must be credited to the good season, but a great deal of the benefit is undoubtedly due to the use of good seed."

Shaw Brothers, of Victoria, N.B., who are illustration farmers working under the direction of the Commission of Conservation were among those who purchased registered seed last spring. These men, writing on July 28, 1913, say:—"Our crops of barley and oats grown from registered seed are looking very superior to crops grown from our own seed. We will need all we raise this year, as we believe it is even better to feed than is the grain raised from our own seed."

Mr. C. Fred. Fawcett, one of our most enthusiastic seed potato growers also writes:—"I never had such a crop in my life. On one short row we dug just 9 barrels of potatoes. I planted two rows through the field with whole potatoes from my registered stock and the above result was accomplished. The rows next to them were the same kind of seed and everything else the same but that the seed was cut. Those rows yielded 6 barrels to the row. The test was a great success."

The winnings of our growers at International Seed Exhibitions are matters of great satisfaction to all interested in Canadian affairs. As instances, we might cite the cases of Seager Wheeler, of Rosthern, Sask., who, in 1911, won the $1,000 prize for the best 100 pounds of hard wheat in the world, and who again in 1913 won the world's prize for the best Alsike clover seed; of Mr. Holmes, of Alberta, who won this prize in 1913 and who confessed to receiving his inspiration and considerable instruction from our Association; of Mr. Paul Gerlach, of Allan, Sask., another member who carried off this coveted trophy at the recent show at Tulso, Oklahoma; of Mr. R. H. Carter, of Fort Qu'Appelle, Sask., whom we also rank among our most deserving members and who carried off the world's prize in barley in 1912, and again this year, and of Mr. Arthur Perry, of Cardston, Alta., another member in good standing to whom was awarded the world's prize in oats at the above exposition.

Two years ago the Stillwell trophy for the best bushel of potatoes was won by Mr. Asahel Smith, of Ladner, B.C., a gentleman who claims to have received much assistance from the experience of other growers as reported in our annual report as well as from personal interviews with officers of the Association from whom he had received encouragement.

An article by Mr. Paul Gerlach telling of how the world's prize wheat of 1913 was produced will be found in another part of this report. (See page 116.)

The plan of holding exhibitions of selected seed and meetings of members in the different provinces or districts has been continued in most cases during the past season except in Western Canada, where the meetings were dispensed with. Meetings and exhibitions have been held as follows: "Maritime District at Amherst, N.S., December, 1913; Ontario District at Guelph in December, 1913; and Quebec District at Quebec in January, 1914."

An exhibition, but no special meetings, was held in Saskatchewan during February, 1914. The prizes for these exhibitions were paid chiefly out of the funds of the various Provincial Fair boards as it is believed that the provinces should now be sufficiently interested in this work to finance these exhibitions direct.

During the past season many contests in the growing of seed by boys and girls have been held in different parts of Canada. The organization of these competitions has been stimulated in many cases by the good work done in 1912 by the boys in the potato contest in Carleton county and which is referred to in our Ninth Annual Report (p. 19). Mr. R. B. Whyte, of Ottawa, who donated the prizes in this contest and who took an active interest in it, repeated

his offer in 1913, not only in Carleton, but in Russell county as well, with the result that sixty-five boys entered the competition in the two counties. The outcome of this work was most encouraging and illustrated the usefulness of these contests as a medium for educating at an early age those who may later become growers of registered seed on a substantial scale.

The past season throughout Canada, has been a fairly favourable one on the whole, although as usual, certain districts have suffered either from drought during the summer or by too much rain at harvest time. In such districts we find that not only is the supply of registered seed practically nil but many growers are looking for a fresh supply for their own use.

The Registration of Different Varieties.

The committee which has to determine what variety shall be accepted for registration for this Association met in the Secretary's office yesterday and discussed the relative merits and defects of certain varieties for which registration had been applied. The desirability of having those varieties most thoroughly tested at the different Experimental Stations was emphasized. The matter of the naming of varieties was also carefully considered and it was recommended that the Committee on Registration be authorized to consider and pass upon any name suggested by the breeder.

At the last annual meeting of the Association a committee consisting of Dr. Jas. W. Robertson, Prof. C. A. Zavitz and L. H. Newman was appointed to convey personally the thanks of the Association to the Minister of Agriculture for the substantial assistance which he had given the Association in promoting the interests of its work. This Committee waited on the Minister on November 15 and not only expressed the appreciation of the Association for the assistance which he had given but took occasion to present a résumé of its present standing and the strides it was taking towards the realization of its aims. The committee reports that the Minister expressed himself as being well pleased with the progress which had been made and stated that he was in hearty sympathy with the work the Association was doing throughout Canada.

The President:—It has been customary to have the discussion of this report at the same time as the consideration of the report of the Secretary-Treasurer. With your consent, we will follow that procedure this morning, and now have the report of the Secretary-Treasurer.

SECRETARY'S REPORT.

MR. PRESIDENT AND GENTLEMEN:—I have the honour to present herewith for your consideration my Eighth Annual Report as Secretary-Treasurer of the Canadian Seed Growers' Association for the year ending March 31, 1914. During the past year, satisfactory hand-selections of seed were made by 181 growers as compared with 153 growers in 1912 and 90 in 1911. The names and addresses of those selecting in 1913, together with the varieties with which they are working, will be published elsewhere in this report. (See p. 9.) Out of the above number, 109 have already been admitted for membership in the Association in full standing, so there now remain 72 who are entitled to membership. I respectfully recommend that these gentlemen be admitted for membership in this Association. The names of these growers are as follows:—

John M. Airth, Renfrew, Ont.
Albert Aitken, Melita, Man.
A. Allen, Perth, Ont.
A. Anderson, Handhills, Alta.
Arnestad Bros., Staveley, Alta.
R. Atto, Lennoxville, P.Q.
W. F. Bailey, Druid, Sask.
Alex. S. Blackwood, De Winton, Alta.
W. G. Boughen, Valley River, Man.
A. L. Brown, Chatham, Ont.
Wm. Brownlee, North Gower, Ont.
George Burrows, Valley Station, N.B.
J. G. Clark, Clark Manor, Alta.
John Coupland, Palmer, Sask.
J. R. Cowan, Milby, P.Q.
J. L. Cunningham, Bay Head, N.S.
Donald Currie, Vanguard, Sask.
A. Dubé, Beauséjour, P.Q.
F. Duval, Champlain, P. Q.
W. B. Ferguson, Starthroy, Ont.
P. Floyd, Marshall, Sask.
George E. Foster, Honeywood, Ont.
Foyston Bros., Minesing, Ont.
Jas. F. George, Le Ross, Sask.
Paul Gerlach, Allan, Sask.
Chris. Grant, Cloverville, N.S.
Fred. B. Hailes, Kindersley, Sask.
Joseph Héon, Ste. Eulalie, P.Q.
W. H. Hess, Oyen, Alta.
F. W. Hodson, Myrtle, Ont.
R. M. Johnson, Pasqua, Sask.
Guy Kirby, Cookshire, P.Q.
Oscar Kloop, Zurich, Ont.
Louis Labrie, Beauséjour, P.Q.
J. F. X. Laliberté, St. Anselme, P.Q.
Alex. Lamont, Mount Brydges, Ont.
J. J. Lanigan, Elfros, Sask.
Robert Leadley, Barrie, Ont.
Grégoire Leclerc, Loretteville, P.Q.
John Lovett, Paris, Ont.
E. H. Martyn, Port Hope, Ont.
W. G. McCurdey, Lennoxville, P.Q.
J A. McDonald, Maryvale, N.S.
James H. McKee, Whitfield, Ont.
Donald McVicar, Portage la Prairie, Man.
Georges E. Morin, St. Hyacinthe, P.Q.
John W. Murray, Balmoral Mills, N.S.
Jackson Newsham, Innisfail, Alta.
Alvin Ouellette, Walkerville, Ont.
Xavier Paquet, Loretteville, P.Q.
L. Parnell, Lennoxville, P.Q.
A. W. Partridge, Barrie, Ont.
S. M. Pearce, Fingal, Ont.
J. Norman Poole, Perth, Ont.
H. A. Putnam & Sons, Silverdale Station, Ont.
George Ramsden, Coteau, Sask.
Marshall Rathwell, Navan, Ont.
J. J. Roberts, Wilbert, Sask.
J. H. Roberts, Earlton, Ont.
G. Shaw, Christies, N.B.
J. Simard, Baie St. Paul, P.Q.
J. A. Slater, Galt, Ont.
C. B. Smith, Blissville, N.B.
D. Stewart, Cairns, Alta.
Martin Talbot & Son, Oban, Sask.
Garnet Taylor, Wellington, Ont.
Thomas Teare, Marquis, Sask.
Miles N. Thompkins, Antigonish, N.S.
R. G. Walker, Heriot, B.C.
E. Warwick, Guilds, Ont.
R. J. Wilson, Charing Cross, Ont.
F. Walker, Royston, Ont.

The number of individual applications for membership which have been received during the year is 236 as compared with 118 in 1912, and with 50 in 1911. In addition to these applications there have been organized in Canada fifty-three seed growing centres having a total membership of 414 growers. From the above mentioned individual applicants, sixty-two have made satisfactory selections of seed and are included among those recommended for election. Others will require at least another year to qualify. Those who are not yet entitled to membership are indicated elsewhere in tabular form, as is also a summary showing the exact standing of the Association. (See page 17.)

The work of inspecting plots and fields grown by members and applicants has been done chiefly by representatives of the Dominion Seed Branch, except in the province of Ontario, where most of this work was done by District Representatives of Agriculture of the Provincial Department. The following is a summary of the work of inspection for the season of 1913:—

	Mar. Dist.	Que.	Ont.	Man.	Sask.	Alta. & B.C.	All Provs.
Number growers answering enquiry card and stating they were operating or that they wished to be visited	34	55	94	13	60	27	283
Total number visited by inspectors	65	46	148	11	40	13	323

Areas devoted to seed plots, quantities of seed produced, etc., in 1913:—

	Alta. & B.C.	Sask.	Man.	Ont.	Que.	Mar. Dist.	Total or Average.
Number hand-selected seed plots operated during 1913	12	38	12	93	22	69	266
Number growers making selection	19	61	13	84	28	42	247
Average size of H.S.S. plots	·4	·4	·4	·2	·3	·3	·4
Total areas devoted to H.S.S. plots	5	23 1-7	5 1-3	16	7 1-20	19	75·5

The amount of registered Seed from the crop of 1913 which is listed for sale in this year's catalogue is 24,839 bushels. The amount of Improved Seed listed is 43,849 bushels. The total amount of seed grain catalogued is very much greater than ever before, being approximately four times as much as that listed a year ago. The number of growers listed in this catalogue is 179 as compared with eighty-five for the crop of 1912.

In the spring of 1913 statements of transfer were returned to headquarters giving the names of purchasers of 9,348 bushels of seed. The above catalogue has already been published to the extent of 5,000 English copies and 1,500 French. These have been distributed widely throughout Canada and should not only advertise widely the seed which is offered for sale, but should also give the work of the Association a great deal of publicity. The number of persons enquiring for our catalogue this year seems to be greater than usual, as people are coming to look to us more and more for information as to the source of reliable seed. The Ninth Annual Report of the Association has been published to the extent of 22,000 English and 6,000 French copies, as compared with 10,000 English and 5,000 French in previous years. This extra number has caused the Association to become much more widely known than ever before, and many enquiries for information concerning the work of seed growing have been received as a consequence.

TREASURER'S REPORT.

The following is the financial statement of the Association for the period between March 6, 1913, and March 6, 1914:—

RECEIPTS.

To balance from last year		$ 612 40
To appropriation from Dominion Government for the current Association year		6,000 00
To sale of Book, 'Plant Breeding in Scandinavia'		234 75
To refund on account of Exhibition		2 65
		$ 6,849 80

EXPENDITURES.

Salaries		$ 2,876 59
Travelling expenses		555 55
Printing and translating		816 68
Exhibitions of Selected Seed:—		
Quebec, P.Q. (Jan., 1913)	$ 96 28	
Ontario Exhibition (Guelph, Dec. 1912)	8 00	
Saskatchewan Exhibition (Saskatoon, Mar. 1912)	37 00	
		141 28
Payment of accommodation loan by Bank of Commerce		1,400 00
Transportation	3 41	
Supplies	177 61	
Expenses of convening 9th annual convention	224 21	
Sundries, including telegrams	50 10	
Interest and exchange	6 05	
Seed supply	71 05	
		$ 6,322 53
Balance		526 27

We hereby certify that we have examined these accounts and have found them to be correct.

L. S. KLINCK,
F. C. CHITTICK.

THE PRESIDENT:—I think hereafter it would be a good plan for the Directors to meet about a month before the Annual Meeting and transact the business of the Board. Then these reports could be before the Annual Meeting in printed form. While we do much good work at the meetings of the Directors the knowledge of what we do, and its bearing on the work of this Association, is too closely confined to those who participate in the discussions. That would not continue to be so much the case if the reports could be in the hands of members a week or two before the Annual Meeting.

I confess that, for myself, I have lost all interest in discussions that are merely called into existence and continued for the sake of conforming to the proprieties.

MR. RAYNOR: I would move that the reports be received and adopted.

MR. MOONEY: I second that motion. Carried.

THE PRESIDENT: It has been customary for the President to appoint at least two committees, and I appoint as a Committee on Resolutions, Messrs. Moorehouse, McLeod and Raynor; and as a Committee on Nominations, Messrs. Duke, Mooney and Moore.

We will now deal with the nomination and election of new members of the Association.

Moved by Mr. Moore and seconded by Prof. Zavitz that the persons recommended by the Secretary be elected members of the Association.

MR. WALLACE: Allow me to ask a question. I would like to ask if those parties whose names were read have put in personal applications to the Secretary, or are their names being brought forward now on the recommendation of those who examined their plots during the past season? That is, have they applied for membership and have they made selections of seeds in all cases?

THE SECRETARY: Yes; every candidate must make a selection of heads and send in a report.

THE PRESIDENT: There are on our records the names of a good many men who are qualifying for membership. When the reports from the inspector, and the application of the man himself, come in, they are examined, and if found satisfactory, his name appears on the list as having complied with all the conditions. There are, I think, nearly 1,000 farmers now doing some part of the work of selecting and operating, whereas we have only about 230 or 240 who have done all the work and are on the full membership list. We hope that next year we will add four or five hundred to our membership.

THE SECRETARY: At a previous meeting that matter was threshed out pretty carefully, and it was decided that in view of the desirability of protecting older members, applicants for membership be required to have at least one year of probation before being regularly elected; and to that end this paragraph was included in our regulations:

> "While records are kept by the Association of all seed intended for registration, and while full credit is given in the records for all work done by each applicant, yet no Certificates of Registration are issued for any seed grow by an applicant during his year of probation, *i.e.* the first year. If the applicant qualifies for membership in the Association, and is elected a member at the end of his first year's work, any seed of any kind of crop produced or selected by him during the succeeding years, and which is otherwise eligible, will then be entitled to receive full recognition through Certificates of Registration."

The qualification for membership consists not only in the recommendation of the field inspector, but in the member himself sending in a satisfactory report and indicating without any doubt that he has made a substantial selection of heads to establish a seed plot the following year. That is the position the Association has taken, and those are the requirements that have been lived up to by the men whose names we have read.

THE PRESIDENT: I may add this further word of explanation. Any seed grower who has done the work satisfactorily so far, and then for any reason, such as not sending in a report, or not having his record complete, is not elected a member does not lose standing for what he has done. All he has done counts, and as soon as that work is completed, he gets his standing for full membership.

What is your pleasure regarding the motion that these persons be elected as members?

(Motion carried).

THE PRESIDENT: Mr. J. Lockie Wilson, Superintendent of Agricultural Societes for Ontario, will now address us on "Field Crop Competitions and their Value in Connections with the Good Seed Movement."

(For this address, together with the discussion thereon, see page 56).

At the conclusion of the above discussion the meeting adjourned till 2 p.m.

AFTERNOON SESSION. FRIDAY, MARCH 6, 1914.

The meeting was called to order at 2.15 p.m., the President in the chair.

THE PRESIDENT: The report of the Committee that has to deal with the consideration of varieties recommended for registration is included in the Report of the Board of Directors (p. 19). I would suggest that the Committee be continued as a standing committee. This Committee has rendered us fine service in the past and, I hope, will continue to do so. It is composed of some of the leading experts who have to do with the breeding of grains and they consider what varieties should be registerable and also what encouragement should be given to naming new varieties.

MR. RAYNOR: I would move the adoption of the report and that the Committee be continued.

MR. HODSON: I second that motion. Carried.

THE PRESIDENT: The report of the special committee appointed to consider the relationship that ought to exist between what are called "seed centres" and the Association is now before you for discussion. I do not know that I need offer any explanation to those who are acquainted with what has been done in forming seed centres. They know the need of some action, and the action here suggested is, in the judgment of this Committee appointed to consider the question, the action we should take. It is substantially this: Where a number of farmers living near each other desire to grow seed according to the regulations of our Association they may be known as a 'seed centre' and that 'seed centre' as an organized body, may be a member of this association. Any one of these farmers may then carry on the hand-selected seed plot and furnish the foundation stock to the other members of the 'seed centre' who would do the work of the second and third years in the way of propagation instead of each man being requested to carry on the work of the hand selected seed plot.

PROF. ZAVITZ: I would be very pleased to move the adoption of the committee's report.

MR. RAYNOR: I second the motion.

THE PRESIDENT: I suppose it is implied that if this be adopted the Directors or the Executive Council shall be directed at the same time to make the necessary alterations in the regulations to make them conform to this action.

PROF. ZAVITZ: Yes.

THE PRESIDENT: You have the motion that this report be adopted and that the Executive Council be instructed to make the necessary verbal changes in the Constitution, By-laws or Regulations to give effect to it. Are you ready for the question? Motion carried.

THE PRESIDENT: The question has been raised as to whether there might be admitted to membership such bodies as agricultural associations or societies. If not as ordinary members could they be admitted as honorary members under the terms of Section 11? That question has been brought up informally. If any member wants to have that before the meeting formally, now is the time so that the meeting may consider it.

MR. GIGAULT: I would move that Agricultural Associations be admitted by the Association as honorary members.

MR. HODSON: What are the views of your Executive Committee concerning that?

THE PRESIDENT: I do not know that the Executive has come to any conclusions. I think some of the members of the other committee gave some consideration to it, but they did not deal with it. I do not think it was remitted to them or germane to what they were to consider. Mr. Gigault's motion directs that, since we have honorary members who are not required to produce seed, provision should be made for honorary members in the form of agricultural associations which, though not producing seed, are interested in the matter of both production and distribution.

PROF. ZAVITZ: I may say that the matter came up for consideration before the committee, but they thought it would lead to complications, for one thing; and another was that it is quite a different idea from that which led to the provision for honorary members. The idea of having honorary members was that there are men of influence who have made their mark along certain lines but who would not be officially connected with the Association, and yet through their past work have had a marked influence, and the Association thought they would like to have such men as honorary members as an honour to them and in order to get their sympathy more fully.

THE PRESIDENT: I am still without a seconder for Mr. Gigault's motion, although I am quite willing to have an explanation of the situation.

MR. GIGAULT: I do not believe that Professor Zavitz' objection should be accepted. You accept as an honorary member a person who has done service to plant breeding and an association may be more useful to that plant breeding than a person. I know some agricultural associations in the Province of Quebec that are doing much more for plant breeding than are persons

and that is the reason why I ask that they be admitted as honorary members. They would receive the reports and publications of the Seed Growers' Association and I believe it would help them a good deal and contribute to making seed growing much more remunerative and much more important than it is now. I might say that I had in mind a farmers' co-operative association existing in Rimouski. Last year it bought about eleven car loads of good Banner oats. These oats were distributed among the farmers of the territory and the farmers have obtained very good crops. Everybody acknowledges that this association is doing a most useful work and I would have been very glad to have it admitted as an honorary member, so that it would receive the reports and publications of your association. These publications would be a guide to their officers in choosing the varieties which should be adopted. Of course if it is not the opinion of this association, I do not wish to compel them to accept my views, but I believe that if my views are not accepted we are doing a thing which is contrary to the purpose for which this association exists. We must not think only of growing good seed, we must look for the means of selling it, and such an association as the one I have just mentioned is doing a good deal in this direction. I know that this year they will sell carloads and carloads of good seed, and the intention of the officers is to try to have the best seed that can be found. I believe they are doing very useful work.

THE PRESIDENT: I am certain the Secretary will make sure that any association such as that will receive as many copies of the report of the Association as it desires to use among its officers and members. This Association desires to co-operate with other bodies doing good work and does not want to limit co-operation only within its own membership either ordinary or honorary.

(There being no seconder to Mr. Gigaults' motion, no further action was taken.).

THE PRESIDENT: In the report of the Directors there was a matter brought up in regard to the constitution of the Board of Directors recommending that hereafter the Provincial Department of Agriculture in each case should be invited to nominate one director. Since you approved of that, if that requires any alteration in the constitution or the by-laws, I would suggest that you authorize the Executive Council in this case also to make the necessary verbal changes.

MR. HODSON: I will make a motion to that effect.

(Seconded by Prof. Zavitz, and carried.)

THE PRESIDENT: The next item is the election of the first ten Directors of the Association for the ensuing year.

The report of the Committee on Nominations was then presented by Mr. Duke, the following being the nominations:—Professors Zavitz, Klinck, Moorhouse, Bracken and Cumming, Mr. A. E. Howes of Vermilion, Alberta; Mr. Wm. McGregor of Miscouche, Prince Edward Island; Mr. Wm. Palmer of Scotch Lake, New Brunswick; Mr. Narcisse Savoie of Quebec and Mr. J. O. Duke of Ontario.

THE PRESIDENT: What is your pleasure regarding these nominations?

Moved by Mr. Duke, and seconded by Prof. Cumming that the report of the Committee on Nominations be adopted. Carried.

THE PRESIDENT: I declare these ten members duly elected directors for the ensuing year. I shall submit to the meeting before it rises five more names. The President is under obligation to appoint five directors; and then the fifteen elect five more; that is according to constitution. Our constitution calls for the election of ten directors, and then ten more are appointed—five by the President and five by those who have been elected. This Board, if elected as nominated, would complete itself by the addition of ten more names.

MR. HODSON: I move that Dr. Robertson be President.

PROF. CUMMING: I second that motion.

THE PRESIDENT: I take it that I should propose someone else. And I desire to say that next year I shall be glad to do so. I have had this office a long time and other interests really engage and engross my attention so much that I am not able to give the association quite the service that I think its President might.

(Motion carried unanimously.)

THE PRESIDENT: I am very glad to serve and do what I can to make the Association still more successful.

DR. MALTE: I regret to say that I cannot accept the honour of nomination as a Director.

THE PRESIDENT: I hope this will be understood quite fully, that we expect just as full co-operation and as great assistance from both Dr. Saunders and Dr. Malte in their present capacity as though they were directors. That goes without saying. It was a rule—and I do not know that it has been officially cancelled—that an officer of the Department of Agriculture could not or should not hold office in a voluntary association having any relations to the department. I believe that rule has been in abeyance and not acted upon recently. It was in force and quite active for years. Since both Dr. Malte and Dr. Saunders are unable to accept nomination, we expect they will give us the benefit of their counsel and help at our meetings, and otherwise just as fully as if they were directors.

The next item on our programme is "Contributions on Seed Growing in their respective Districts by the Representatives of the Seed Branch of the Department of Agriculture." If I might venture a suggestion, it would be to this effect: I would be delighted if each of those who may speak to us this afternoon would prepare a summary of the work he has done in co-operation with this Association to appear in our annual report. Thirty-thousand copies, I suppose, are distributed and we would like to have the information reasonably complete. I take it that if a district representative has not much to say that would be important for this meeting to know, we would be glad if he would prepare such a statement as I have indicated. Then it will go broadcast over Canada, to show the relationship of his work with the association's work in general, and to show the continuation—which I hope will always exist—the continuation of not merely the spirit of good will and good feeling, but of hearty practical co-operation between the Seed Branch and its officers and this Association.

(For these contributions, see page 37.)

THE PRESIDENT: May I be permitted to vary the programme a little by sandwiching in the statements from the district representatives between the papers to be presented. We had a very excellent statement from Mr. LeLacheur. I say this to Mr. LeLacheur, and I say it to the whole number of those representatives—our fellow workers—that I have my eye on them, as President, and there is not a man of them that is going to do more than I expect of him. And I want them to believe that I have the right, from my knowledge of them, to expect a great deal. They do the country fine service in fullest co-operation and sympathy with the work of this Association.

We will now have a paper by Professor Klinck on "Soil Management in Relation to Yield and Quality in Seed."

(For Prof. Klinck's paper, see page 68).

THE PRESIDENT: While the subject of the paper to be presented by Dr. Charles Saunders is not the same as the subject of the paper by Professor Klinck, yet I think they could be discussed together better than separately. So, with your kind consent and Dr. Saunders' consent also, I would ask Dr. Charles Saunders, of the Experimental Farm, to present his paper on "Difficulties encountered in the Propagation of Pure Seed."

(For Dr. Saunders' paper, together with the above mentioned discussions, see page 75).

THE PRESIDENT: Before the discussion on these two papers begins, may I repeat the intimation I made that a meeting of the Board of Directors as now constituted will be held at 7 o'clock at the Rideau Club.

MR. G. H. CLARK, Seed Commissioner: Mr. Chairman, you were kind enough to refer to the good work that has been done by members of the Seed Branch in connection with the field work of the Association. I want to assure the Association of the whole-hearted support and co-operation of each and every member of the Seed Branch staff for future years. The work of the field officers of the Seed Branch has greatly increased during the last two or three years. Formerly we had $40,000 or $50,000 a year to use for the improvement of seed, but now we have more than twice that amount, and naturally the work in each district and under each district officer increases rapidly. We have much work that we are trying to get done, and it happens very frequently—and the difficulty is increasing every year,—that our men are so busy at the time when the Association needs them, that we have of necessity to farm out a great deal of that work to other men. The sealing of the seed grain in the sack comes at a time of year when our men are fully employed. I have discussed the matter on several occasions with your Secretary, Mr. Newman, and this morning I had a discussion with the Minister in respect to that matter; and although Mr. Newman stated to me that he was not in a position to express the wish of the Association, I think perhaps personally he and I concur in the idea that instead of the Seed Branch employing special men to do the work of the Seed Growers' Association, it would be better if the Association would do that directly. I am pleased, therefore, to tell you that the Minister has consented to increase the grant to the Association to the amount which we believe will be sufficient to enable you to take over that work without suffering inconvenience. You will understand that a change of that kind is better if made gradually, and we are quite prepared to support Mr. Newman and the Association so far as we can, in a way that the change may be in the best interests of all concerned.

THE PRESIDENT: I am sure I may say for the Association that since the objects of the Association and the Seed Branch are so nearly identical, and since their field of operation is the same, we can hope for economical and efficient

service to Canada by co-operating in the most cordial way and each doing our part of the work as well as we can, in fullest understanding and sympathy with the other. Hitherto we have had the experience of friendly and official co-operation, without much regulation and without any friction, and with the greatest advantage to all interests concerned. If it is thought best by those immediately in charge and by the Minister of Agriculture, who would have the final decision, that this increasing work of inspection of seed for sealing and labelling should be done by persons employed by the Association, the Association will try and meet that circumstance and situation. I daresay that is the better course to follow. The Association has now decided to charge certain fees—one or two cents per bushel—for the grain so inspected and sealed. That will enable the Association by and by, we hope, to derive from that work a revenue which, if not quite fully equal to meeting the charge for that service, will come near doing that. Our expectation is that the good relationship and cordial co-operations that have ever existed between the Seed Branch and the Association will continue, and that wherein the Association can serve the Department and serve the Seed Branch, it will find satisfaction in doing that. I can look back with the utmost satisfaction on those ten years of cordial co-operation between this Association and the Seed Branch and say, as I have frequently said to the Minister personally and in public, that the Association is grateful, and indebted to the Department of Agriculture, for the wherewithal to carry on its work and to give a kind of service that only a voluntary association could render, supplementing the work done by those who are officials of the Department.

THE PRESIDENT: Unfortunately Mr. Jackson, who was to present a paper on "The Seed Centre as a Basis of Supply of Registered Seed," had to leave to meet another engagement, but he has promised that he will provide his paper in good form, to go into the Annual Report.

(For this paper, together with the discussion thereon, see page 85).

THE PRESIDENT: Some skill and power possessed by ancient men are not in our possession. We have no Joshua, to make the sun stand still, and six o'clock will be here. To perpetrate the social atrocity, in Ottawa, of keeping a public meeting going after six o'clock would leave us liable to all kinds of reproof. So, whatever might have been said of interest—and I am sure a good deal would have been said on these topics—we will leave unsaid on this occasion, and bring the last session of the Association's convention to a close.

I would ask the Secretary-Treasurer to present the financial statement of the Association. (For this statement see p. 28).

Moved by Professor Zavitz, seconded by Mr. Raynor, that the statement of the Secretary-Treasurer be received, and when properly audited, be duly published as part of the proceedings of the meeting. Carried.

MR. MOORHOUSE: The members of your Committee on Resolutions beg leave to submit the following report:

1. *Resolved*, that this Association place on record its appreciation of the continued support given it by the Department of Agriculture and by the District Representatives of the Provincial Department of Agriculture, who have inspected most of the work of members in Ontario.

2. *Resolved*, that the thanks of this Convention be presented to the Hon. Martin Burrell, Minister of Agriculture, for the substantial aid which he has given this Association in promoting the interests of its work, and that this expression be conveyed to the Minister by the Executive of this Association.

3. *Resolved*, that this Association record its appreciation of the addresses and papers which have been presented at this Convention, and that we express our thanks to all those who have contributed in making the sessions a success.

4. *Resolved*, that the appreciation of this Association be extended to those Railway Companies which have granted reduced rates on shipments of Registered Seed in Western Canada.

5. *Resolved*, that our thanks be tendered to the Press for the publicity given the Convention, and the work of the Seed Growers' Association during the past year.

Messrs. MOORHOUSE.
McLEOD,
RAYNOR,

MR. MOORHOUSE: I move the adoption of this report.

MR. RAYNOR: I second that motion.
(Report adopted.)

THE PRESIDENT: I hope those who have served us, and, through the Association, the rural population of Canada, by presenting papers and delivering addresses and participating in discussions, will bear in mind that those of us who are responsible for the meeting made no effort to secure the attendance or presence of a crowd at this or these gatherings. That sort of gathering is not the purpose of this Association, or the means through which it can best do its work. But every one who read a paper or contributed an address here, will speak persistently and, I think, effectively, in the quiet of homes to an audience of thirty thousand people. If the Government, as usual, prints thirty thousand copies of our Annual Report, and these go into thirty thousand homes of the rural population, what a fine audience every man who spoke here will reach!

I agree with Dr. Saunders when he outlined some of these ideals that he is quite sure he will attain some time soon. Good things, now apparently unreachable, he is quite sure he will grasp some time before long. The ideals we had last year we are certain now we will reach next year; and when next year comes our ideals will again be so much ahead of us that they will still constrain to extend our stretch and to strengthen our grip and so hold fast all we have found to be good.

I declare this convention closed.

PART II.

ADDRESSES AND CONTRIBUTIONS.

Address by President, Dr. Jas. W. Robertson, Ottawa.

GENTLEMEN,—We are to have the satisfaction of two excellent papers to-night, and, I hope, some interesting and useful discussion. The Secretary has put on the programme, before them, the two words, "President's Address."

I have made some ten presidential addresses to this Association on the occasion of its annual gatherings; and to-night I propose to make a very brief statement as to the origin and the objects and methods of this Association, in order that those who have belonged to it from the beginning may be reminded of the real meaning of our work, and that those who know less of the Association may be informed of the purpose and plan according to which it carries on its activities.

I do not wish to encroach on the time of the evening by a detailed statement of the romance of this Association's origin. However, I venture to suppose that, fifty years hence, when some writer wants to illuminate a wider horizon for another great forward movement in farming in Canada, he will find material for a romance of rural life in the story of the origin of this Association. The reality of the Association's service will some time, I think, more than match the quality of the romance. Shall I give you just the high lights of the romance?

Fifteen years ago this summer, a citizen of Canada put aside $100 only, of pocket money, to encourage boys and girls on their fathers' farms to pick the best heads out of the standing crops of wheat and oats. These were to be sent to Ottawa; were to be carried free through the mail, because all correspondence for the Commissioner of Agriculture's office came with that privilege. The $100 was offered in prizes to the boys and girls who collected the 100 best heads—best in point of size, number of kernels and weight of grain. There was a wonderful response. I remember the bags containing those selected heads coming in almost like a deluge on us. And all that the boys and girls got out of it was $100 in prizes,—plus much enjoyable education, enlightening enthusiasm and intelligent encouragement to go on in this new way of growing better crops through better seed. That was the beginning.

One of the rich and public-spirited men of Canada was told that this was a means whereby a sum of money could be invested with the certainty of large returns to the farmers. It was to be the kind of high finance that enriched the people and brought no return to the original investor, except the satisfaction of doing good and good only with his money. Therein lies the romance. I recall the circumstance. A member of this Association sat in his library toasting his toes three nights before Christmas. The baby was tumbling around on the rug, and other children of Canada were in mind. Then the romance began to evolve. The small sum of $100 had been the means through which youthful enthusiasm had been directed into wakeful interest about seeds and crops. Probably if better prizes, and more of them, could be offered, more boys and girls might be beguiled into this fine task of gathering specimens of life at its best out of the crops of the farm. Probably that life might be reproduced in a better way on the fields of the same farms the next year, and in a continuous process afterwards. A little figuring made it apparent that about $10,000 would beguile enough boys and girls into that plan, into that experience to

affect the whole of Canada. One hundred dollars was to be the first prize in each province, at the end of three years, to the boy or girl who did the best work with wheat, that is, who got the best returns out of three years' effort on the home farm. A similar prize in each province was to go to the one who did the best work with oats. And so, that too many would not fall out by the way, the boy or girl who did the best work in each intervening year, in each province, with wheat and oats respectively, was to get $25 as a first prize. The second prizes were $75 and $20 respectively in each group and province, and so on, down. These prizes rolled up the amount to $10,000, and that looked an enormously large sum of money to invest in merely trying to lead boys and girls into a larger experience and understanding of life and happiness through intelligent effort in selecting seed-grain on the farms where they lived. Well, Sir William Macdonald, of Montreal, did not think it would be wasting money, and he put up the $10,000. I am confident he enjoyed his part of the unromantic romance.

Fifteen hundred boys and girls entered the contest. There was a first-rate race—the best race I ever was connected with, or heard about, that race of fifteen hundred boys and girls. I have been at horse races—at the great Derby. It is worth while to see in a great horse race whether the quality of life, inherited out of selected parents, has the endurance to win out in the last three strides. That is in horse racing as managed by that part of the human race that is honest. I like a horse race for that "last stride" that puts a horse ahead because he could endure unto the end. This was a boy-and-girl race, not merely for the prizes of $100 each, but for the first places with and through the wheat and oats. The contest was to obtain the best quality of life in wheat and oats and the best results in wheat and oats from the management of plant life by boys and girls.

What is the meaning of "the crown of life?" Surely not something stuck on as a decoration for display. These boys and girls crowned their own lives by improving lower forms of lives. That is the only crown that is worth while. That was the real prize in this race. Those won it who developed in themselves a better quality of life through managing the life of wheat and oats where they lived. The cash prizes amounted to $10,842; and that was all paid to the boys and girls.

What were the results in the crops? The records sent in by the boys and girls from their plots of the first year were compared with the records sent in the third year by the same boys and girls on the same farms. They stuck to the seed they had begun with, selecting the best plants for seed for the following year. Observation, study and experience developed their ability, and they applied improved methods of management. On the average the competitors got 40 per cent more crop on their wheat plots the third year than they got the first year of the competition. That is the record of over 450 competitors. something worth while, was it not? On the oat plots the boys and girls got 36 per cent more crop to the acre the third year than the year they began. The weight of the grains from 100 heads, from the same boys on the same farms, was, in the case of wheat, 28 per cent more in the third year than in the first year. In the case of oats the increase was 27 per cent. That was something worth while. Mr. George H. Clark was the clerk who kept the records and supervised the competition. That is only fourteen years ago; and now, Mr. George H. Clark is Seed Commissioner for all Canada, and I think this year the vote by Parliament for the work of his Branch of the Department of Agriculture will be $125,000.

The boys who had done this work and their fathers became the Macdonald-Robertson Seed Growers' Association. That was in March, 1903. In the following June the same Association was called "The Canadian Seed Growers' Association." That is part of the romance of the origin and birth of this Association.

I would like all its members to live up to this fine ancestry of enthusiasm and achievement by these boys and girls. In three years they got crops of wheat 40 per cent better, and crops of oats 36 per cent better, through their management, than they were at the beginning. That is what they did.

The objects of the Association, in brief, are that there shall be on Canadian farms, larger yields of crops per acre, those yields of better quality, grown under more intelligent management, by better satisfied men—better satisfied with what they have done, with what they have got and with what they are becoming. There are many other agencies working for the same objects—for the good of agriculture. Our objects are definite and specific and particular. When I was quite young—that is, a little younger than my present youth—I was willing to approve of a great many organizations of a nebulous sort—particularly general instead of being generally particular and specific. We in Canada have been in the habit of associating ourselves for nebulous objects and consequently have done our work in a haphazard way, without much advantageous consequence to the quality of our lives. Let me commend to you in this connection what I learned from Denmark, that country of wonderful organizations of voluntary kinds for the improvement and benefit of rural life. In an area no larger than the part of Quebec that lies south of the St. Lawrence and east of Quebec city—and that is not a vast tract of land, although it is about the size of Denmark—the Danes have 1,835 associations for the improvement of live stock of various kinds. Those people, by the organization of themselves into bodies for specific purposes, to achieve definite ends of value to themselves, have brought themselves to a foremost place in all Europe in general intelligence and in agricultural affluence and influence. That has all been accomplished within my own brief lifetime. When I was a boy on the hillsides of my father's farm, they were the poorest nation in Europe. To day Denmark stands next to Great Britain in the average wealth of all the people. In Denmark the wealth is diffused, whereas in England there are about 30,000 people with a bull-dog grip on the largest share of the wealth and millions on the verge of destitution. I respect and admire Denmark's methods,—definite, particular, specific, for the common good, and therefore bringing out the best efforts of each individual for the good of all as well as for his own benefit.

What is the result of this Association's work on the seed-grain situation in Canada to-day, as compared with ten or twelve years ago? Many thousands more men now recognize that seed does not mean merely grain, but that seed means a contained life. It means the quality and power of the contained life which gives the plant rising from the seed commensurate power to overcome obstacles—power to gather substance out of the atmosphere, to roll up energy from the sunshine, and to suck up nutriment from the earth, garnering from air, —sun and soil, strength and beauty and wealth for us. That is seed-grain—grain with the capacity for performing that function for us. It used to be just anything in the shape of grain that would grow. The situation is now better understood and better managed, because of the diffusion of information and the development of intelligence by means of this work.

What has been the effect in the case of particular strains of seed-grain? I appeal to the men here, who know what seed is, if they have not intimate knowledge now of certain strains of seed-grain that are better than the world ever knew before. For a space of many thousands of years the power of a seed to yield a serving plant had probably not been augmented one single iota, one single atom, one single cell. I think the grain of Egypt, in the collecting hands of Joseph, was just as good seed as the grain in Canada twenty-five years ago. But there is better seed grain in Canada now than was in Canada then; greatly better. You know one of our members out at Rosthern, Mr. Seager Wheeler, sent over to a great exhibition in New York City, where I had the happiness of seeing the sample, wheat which captured the thousand-

dollar gold prize for the best wheat on the continent. We have a photograph of the crop from which that grain was taken. It yielded at the rate of 81 odd bushels to the acre. It was not at all from the soil, or climate, or management, but from the improved power of the seed, the Marquis wheat. The new variety is a result of the application of human intelligence to wheat life. Instead of the strength of the wheat race, or of the human race, having reached the limit or being exhausted or weakened, I believe we are just at the beginnings of larger, wider and more enduring powers. There is a great difference in our knowledge of the individual strains of seed, and we are just beginning to know something of their qualities in an understanding way. Two fundamentals of all progress, in crops and in conduct and in character, act and react on each other. These are, on the one hand, the quality and power of life; on the other, the conditions and opportunities for the life to exercise its functions. The former are represented in the seed; and the soil and the climate and the cultivation determine the latter.

It is not enough, in farming or in anything else, to add to the sum total of material things. That is worth while; but it is far more worth while to add to the sum total of the thinking power of the people. That is what the Canadian Seed Growers' Association does on the farms. The thinking power of the people finds its best expression in active exercise in managing rural life, enriching and exalting and extending the moral power of the people. The man who has studied seed and got an insight into meanings of life, will respond, will behave, in all relationships in a wiser, nobler way in his own life. So we have great advantages, besides the material increase from bigger crops,—the thinking power of the farmer having been greatly improved, and his moral power having been immensely augmented.

I come to the very last that I have to say, and I must deal with it very, very briefly. The methods of this Association vary as applied to different crops, but they are always on the principle of the selection of the best, of what has proven itself the best by giving the best results in the crop. We set up standards. We accept the standards set up by the plants which by their existence prove that they have overcome obstacles more successfully, because they have bigger heads and better quality there, than the neighbouring plants. By their fruits ye shall know them. The selection of those plants and then the sowing of seed from them under the best conditions, so that the quality may be still further improved from the better chance provided by cultivation, that is selection towards increase of service, prosperity and power. It brings about more intelligent planning on the farm. If there be anything in which Canada is sadly deficient, it is in the habit of forecasting and planning, and then sticking to the plan until there is some good cause to modify or vary it. We do not plan like the older nations. We plunge all the while, in business and farming and social life and politics. We are becoming a nation of plungers, and a nation of plungers cannot get the most out of life or give the best chance to the weaker units in its life.

When a boy begins to plan his seed plot, he is thinking of the heads he will select, and the crop of the next year. If he modifies his plan because he has learned how to do the work better, to meet the conditions more successfully, to achieve better results, he himself is growing to more advantage than even his seed plot. Any man who has attended these meetings and read the reports of the Association knows the difference between the intelligence of the farmers now, as applied to seed selection and growing, and what prevailed ten years ago. The change is a renaissance, such as art never enjoyed in the same length of time. Canada will look back fifty years hence on these things as the beginnings of a great forward movement illuminating rural life with resultant improvement in crops and in the intelligence and capacity of the farmers themselves.

We had 240 farmers producing hand-selected seed. This year there will be 1,054 farmers doing that kind of work, and I do not know how many thousands of farms carrying crops grown from seed improved by these methods I have been speaking of. There will be three million dollars more money in Canadian pockets next autumn from the acres tilled with the same labour, ripened by the same sun, and marketed under the same conditions—three million dollars more money in the pockets of the Canadian farmers than, humanly speaking, would have been theirs if this Association and its work had not been going on these ten years. I would like to know if anybody would not feel proud of the fact that without robbing a single poor man or woman of one cent, and without hindering the upward progress of one boy or one girl, at the end of ten years' business, he was able to say, "I am not making three million dollars a year for myself, but because I have carried on this business, the rural population of Canada is enriching itself to the extent of three millions, for better homes and finer schools, with more leisure and a loftier outlook for the young people."

On the whole, I feel that I can speak on this tenth occasion with satisfaction of the romance of this Association. I recall that hundred dollars. I claim your judgment. Did you ever hear of any high finance that was comparable to that $100, and the $10,000, and then the Seed Branch of the Dominion Department of Agriculture with $125,000 a year, voted willingly by Parliament for its work, and the plain farmers, the common people, not common in an unworthy way, but common as sunshine, common in the most extensive infinite way of God's blessings—getting three millions of dollars more for their comfort, that they might be happier and better people. Again I say that to him who doeth these things and doeth them continuously, is the Crown of Life—better life in the plant, better life in the boy, more beautiful life in the girl, a happier, nobler, richer life in the farm homes of Canada. That is what helps to make the nation great.

The Production of Seed of Alfalfa in Canada.

(C. A. Zavitz, Professor of Field Husbandry, O. A. College, Guelph, Ont.)

Alfalfa is being grown successfully in Ontario, and the area has been increasing largely within the past few years. It is also grown in each of the other provinces of the Dominion, but to a much more limited extent. A large amount of experimental work has been conducted with alfalfa at the Ontario Agricultural College at Guelph. In experiments extending over a period of sixteen years the alfalfa has given an average of three cuttings per year, with a total annual production of 19.9 tons of green crop and 4.8 tons of hay per acre. These results have been obtained from experiments conducted in different parts of the experimental grounds and from different seedings. In every case the crop was sown in the spring of the year, and at the rate of from 18 to 20 pounds of alfalfa seed per acre, and usually with a grain crop such as barley sown at the rate of one bushel per acre. The average dates of cutting for the sixteen years were June 21 for the first, July 31 for the second and September 19 for the third. As a rule the first crop in the season has been about double that of the second, and the second crop has been about double that of the third. In some years the yields of alfalfa per acre have been about twice as large as those of other years.

Besides experimental work at the College, co-operative experiments have been conducted throughout Ontario, through the medium of the Ontario Agricultural and Experimental Union. This work has enabled us to glean information regarding the success of alfalfa under varying conditions throughout

Ontario. Alfalfa usually thrives on a good fertile soil of almost any character, providing it is furnished with the proper kind of subsoil. It does particularly well, however, on undulating clay land, except on the lowest portions. Good results cannot be expected from growing alfalfa on land which has a cold, sour, wet subsoil which is deficient in lime. It is probably safe to say that the under soil has a greater influence than the soil at the surface in making the conditions favourable or unfavourable for the successful cultivation of these deep rooted plants. It is necessary to grow alfalfa on land which is well underdrained. If the land has a good natural drainage and is not too dry and open, alfalfa finds conditions very favourable for the development of its deep roots, and for its continuous growth from year to year. If these conditions do not exist naturally, however, owing to a lack of under drainage, it is very necessary to drain the land to a good depth in order to permit the alfalfa roots to enter the subsoil. If the water level is near the surface, the alfalfa plants usually die in a short time.

From extensive inquiries made throughout Ontario we learn that alfalfa is grown most extensively in the counties of Haldimand, Lincoln, Welland, Wentworth, Brant and Lambton, although it is grown considerably in a number of the other counties, and to a more or less limited extent in practically every county of the province.

According to the reports of the Bureau of Industries for the Province of Ontario, alfalfa was grown on 189,959 acres in 1912, and on 167,707 acres in 1913. This shows a decrease of over 22,000 acres in the one year. The large decrease was undoubtedly due to large areas being sown of tender varieties which were badly killed out in the winter.

According to the Census and Statistics Report of the Dominion of Canada, the percentage of alfalfa grown in each of the different provinces is about as follows: Ontario, 74; Alberta, 10; British Columbia, 7; Manitoba, 5; Quebec, 3; and the Maritime Provinces, 1. It will therefore be seen that about three-quarters of all the alfalfa grown in the Dominion of Canada is produced in the province of Ontario. With the proper management, however, the area of alfalfa in all of the provinces of the Dominion can be greatly increased. The work of the Canadian Seed Growers' Association should do much in bringing this about through the more extensive production, and the distribution of the hardy varieties.

ALFALFA SEED PRODUCTION.

It is not the place in this address to discuss fully the importance of using seed which is strong in vitality and free from impurities, of the importance of inoculating the seed with the proper kind of bacteria before it is sown, of sowing in the right way, at the right time, and on soil which is free from weeds and weed seeds, and which is in a proper state of cultivation. It is the sphere of this address, however, to discuss alfalfa seed production in this country. As near as I have been able to ascertain, alfalfa seed can be produced successfully in several places in Ontario, and in sections of the Western Provinces. In these different sections of the country there is probably no place more suitable for alfalfa seed production in Ontario than on the rolling clay land extending along Grand River, and from Brantford, Caledonia and Cayuga eastward through the central part of the Niagara peninsula. Professor Smith, now of the Agricultural College of Maryland,and formerly in charge of the United States alfalfa work east of the Mississippi river, informed the speaker that he considered the Niagara peninsula in Ontario more suitable for alfalfa seed production than any other portion of the country east of the Mississippi river. The section of the country coming next to the Niagara district in this respect was the district around Utica, New York. In the Niagara peninsula the soil is very suitable,

as shown from the fact that alfalfa has been grown in that district successfully for more than forty years, and during that time a hardy strain of alfalfa has been developed, which is now known as the Ontario Variegated. In the Western Provinces it seems evident that a considerable amount of alfalfa seed will be produced in the semi-arid country of Southern Alberta. Although the climate is severe in parts of that country, the dry condition of the soil permits the alfalfa to thrive comparatively well. The Milk River valley in Montana, just south of the Canadian border, is becoming a noted alfalfa-growing district It is possible that sections of Alberta may become noted for the production of hardy alfalfa seed in the near future.

In some parts of Ontario the production of alfalfa seed is becoming quite an industry. As both a crop of hay and a crop of seed can be produced in the same season, many of the alfalfa growers find seed production quite profitable. The production of alfalfa seed is important not only to those who actually produce the seed but also to the farmers, who are thus enabled to secure seed which has been produced in a climate similar to that under which the crop is to be grown. From extensive inquiries made from farmers who have grown alfalfa seed in Ontario for at least five years, some very valuable information has been obtained. We learned that alfalfa seed had been produced with success in at least 13 counties in Ontario. In all cases where seed was produced it was taken from the second crop, the first crop of the season being converted into hay. The yield of alfalfa seed per acre varied considerably, the highest being seven bushels, and the average a little over two bushels per acre. The farmers determined the time for cutting the crop for seed production by the colour of the pods, most of them stating that the crop should be cut when the pods were brown, although some of them left the crop until the pods were almost black. The majority of the farmers cut their seed with a mowing machine, and a number mentioned having a table attachment to the machine. About twenty per cent used the reaper, and about twelve per cent used the self-binder. As a rule the crop was cured in the windrow by those who used the mowing machine, and in the bunches by those who used the reaper, or the mowing machine, with the table attachment. Those who used the self-binder cured the crop in shocks. The threshing was done mostly with a clover machine, and took place almost any time after the crop was harvested until mid-winter. When the threshing is done in the autumn it is preferable to have dry weather, and when in the winter to have cold weather, in order to get the best results. Nearly all farmers have reported obtaining good quality of seed in most years. The seed has been sold chiefly to neighbouring farmers and local dealers. The greatest difficulties reported in alfalfa seed production in Ontario have been from the injuries caused by grasshoppers, wet weather, blighted plants, early frosts, and a few mentioned trouble from thick seeding. The ideal condition appears to be a comparatively moist season for the production of the hay crop, and a rather dry season after the hay has been removed from the land. Nearly all the farmers stated that they considered seed production did not injure the plants. Nearly all were enthusiastic alfalfa growers from the standpoint of both hay and seed production. Unfortunately the last two or three years in Ontario have been more unfavourable for seed production than almost any of the fifteen years previous. Many of the farmers in the Niagara peninsula have either used their own seed or have bought the seed from their neighbours. In this way the same strain has been used for a longer period of time, and many of the tender plants have become killed out. Although this system has been conducive to the production of a hardy strain of alfalfa, it has at the same time permitted the growth of a considerable number of weeds along with the alfalfa. In the last few years a number of the best farmers have been endeavouring to produce the hardy alfalfa as free from weeds as possible. I believe that this section of the country will in time become a noted district for the production of a large quantity of

hardy alfalfa seed, to the advantage not only of the farmers who produced the seed, but also to that of many other farmers throughout Canada who are anxious to buy hardy alfalfa seed for use on their own farms. There is a great opportunity for seed producing centres where the hardy alfalfa can be grown so successfully for the production of both hay and seed.

DIFFERENT KINDS OF ALFALFA.

Alfalfa is a deep rooted leguminous plant, perennial in its habit of growth, and under favorable conditions will live and produce crops for many years. Formerly it was called lucerne in the Eastern part of America, but the word "alfalfa" is now used almost universally. We have had under experiment at the Ontario Agricultural College four species or types of alfalfa which are here described somewhat in detail.

Common or violet alfalfa (*Medicago sativa*), is the species which has been grown extensively for centuries in some of the comparatively warm countries of the world. It is this type of alfalfa which is grown almost entirely in Central America, and in Mexico, as well as in Texas, California, Utah, Colorado, Nebraska and Kansas, and in other Southern and Central States of the American Union. The plants of the common alfalfa have an upright growth and numerous stems which grow from the crowns of the roots. The flowers are violet in color, the colouring matter appearing in different degrees of density, extending from a comparatively deep to a very pale violet, the latter being almost white. The seed pods are coiled in two or three spirals; the seeds are kidney-shaped, and are about one-twelfth inch in length.

Variegated alfalfa (*Medicago media*), is supposed to be a natural cross between the Medicago sativa and the Medicago falcata. The plants are mostly upright, but some have a spreading habit of growth. The flowers are variegated in color, and besides the violet include shades of blue, green and yellow, and various blends of these with each other and with violet. The seed of the variegated closely resembles that of the common alfalfa.

Yellow lucerne (*Medicago falcata*), grows wild in some of the European and Asiatic countries, and is considered to be very hardy. It generally has a spreading habit of growth, the stems being somewhat slender, and the leaves rather narrow. The flowers are yellow in color, the seed-pods are sickle-shaped, and the seeds are somewhat smaller than those of the common alfalfa.

The hairy-stemmed yellow lucerne (*Medicago ruthenica*), has a spreading habit of growth, yellow flowers with brownish centres, seeds brownish in color, flattened, distinctly lobed, and less kidney shaped than those of the common alfalfa.

Two different lots of each of these four species of alfalfa were sown under uniform conditions in the spring of 1909. All plots became very well established, the germination being satisfactory throughout. The average results of the two lots for the four years show the following yields of hay per acre per annum: variegated alfalfa, 3.4 tons; yellow lucerne, 2.2 tons; common or violet alfalfa, 1.1 ton; and hairy-stemmed yellow lucerne, $\frac{1}{4}$ ton. The cause of the low yield of the common alfalfa was the fact that in each of the past three years a considerable proportion of the plants were killed in the winter. The reason that the results are so low from the hairy-stemmed yellow lucerne is because the plants produced a very small amount of growth. The Variegated alfalfa and the yellow lucerne were both hardy, and gave larger yields per acre in 1913 than they did in the average for the four-year period.

There are many varieties of alfalfa. These have obtained their names largely from the countries in which they have been grown for a length of time, from the men who have become prominent in the introduction or the improve-

ment of alfalfa, from the color of the alfalfa flowers, etc. While some of these different kinds do not vary from each other to any great extent, from a botanical standpoint, there are some marked variations in hardiness and in productiveness.

Of the different varieties of variegated alfalfa which have been grown at the College, the Grimm, the Ontario variegated, the sand and the Baltic have all given satisfactory yields and have proven hardy. Of the common or violet alfalfa, the Turkestan seed obtained from Asia has given fairly satisfactory results. In no case has the seed of the common variety, which has been obtained from the United States, given satisfactory results. Seed of the common variety was obtained from Texas, Kansas, Nebraska, Colorado, Utah and Montana, and in every case the plants have been badly winter killed. The common variety grown in Ontario has given fairly good results, being superior to the common alfalfa obtained from each of the States of the American Union, but inferior to the Variegated alfalfa grown in Ontario.

As the result of numerous experiments, I consider that particular attention should be given at the present time to the increase of pure seed of the Grimm and the Ontario variegated varieties of alfalfa. At the Ontario Agricultural College we have made various selections of these alfalfas, and also of the sand lucernes and of the yellow flowered falcata and the results are exceedingly interesting and quite promising. We found one plant with creeping root stalks which was sending shoots to the surface and producing new plants from twelve to fifteen inches from the mother plant. This was a very interesting specimen, and we now have a considerable number of plants obtained through cuttings from the original plant. I simply mention this to show that there is room for excellent work, and that the new strains which will in time be developed at some of the Canadian Experiment Stations will undoubtly be of great value to Canadian agriculture.

SUMMARY.

1. Alfalfa can be grown successfully in many parts of Canada.
2. There are certain sections of the Dominion which are particularly well adapted for the production of seed of the hardy varieties of alfalfa.
3. That the Grimm and the Ontario Variegated varieties of alfalfa should receive our special attention at the present time.
4. There should be seed growing centres established for the production of pure alfalfa seed of the hardy varieties.
5. The Canadian Seed Growers' Association has an opportunity of doing some good work in the development of hardy alfalfa seed production in Canada.

DR. MALTE. In his most excellent paper Prof. Zavitz stated that at present the growing of alfalfa is in a critical position in Ontario. I would like to extend that statement further. I would like to say that the time is critical in the history of alfalfa growing in Canada, especially in those district where farmers cannot safely rely upon the grain crop. In Western Canada they have begun to realize that mixed farming must be introduced sooner or later. When that day comes feed must be provided for the cattle, and I do not think that any plant is more suitable and has a greater future in the West than alfalfa. It is always a dangerous thing to introduce a new thing into a country. If it does not succeed, everybody will lose confidence in it, and men introducing a new plant like alfalfa must be most careful in starting in the right way. If they do not they risk spoiling the work for many years to come.

Professor Zavitz stated that the varieties of alfalfa that we could rely upon at present were the so-called variegated alfalfas and that efforts should be made by the Canadian Seed Growers' Association and others interested in the problem to produce good seed of these varieties. I am entirely in sympathy

with what Prof. Zavitz said. At present the so-called variegated alfalfas are undoubtly the varieties that we can safely rely upon and the only ones we can safely rely upon for most parts of Canada. The reason for this is, as was briefly indicated by Prof. Zavitz, that variegated alfalfa is a cross between the hardy yellow lucerne and the blue-flower variety of alfalfa. When I say "variegated alfalfas" I mean the Ontario Variegated, Grimm's, sand lucerne and baltic. Botanically, there is no difference, as was pointed out by Prof. Zavitz, and I might add one thing more: there is no difference between the baltic, so-called, and the Grimm's alfalfa. The so-called baltic alfalfa, which has been advertised widely this year, has nothing to do with the Baltic Sea in Europe. It was grown originally in a place in Dakota called baltic, by a farmer who got a supply from Grimm's stock. This is what I have heard from the manager of the Canadian Wheat Lands Company in Suffield, Alberta, who states that there is practically no difference between the baltic and Grimm's alfalfa. Both are excellent. Both of them can be compared as to hardiness with the Ontario variegated alfalfa which Prof. Zavitz has made Canadians, especially in the East, familiar with during the last few years. At present these varieties are best for seed raising because they are hardy and because they produce seed from which plants, able to withstand Canadian winters can be raised.

I might ask one question now. Is it possible for the Canadian Seed Growers' Association by applying their methods to the variegated alfalfas to improve their yielding capacity and their seed production?

Yes, I think it is. I think the Canadian Seed Growers' Association has a wide field to work on; that the Canadian Seed Growers' Association, by applying its methods to variegated alfalfas can, through its members scattered all over Canada, produce several superior strains from the variegated alfalfas. The yielding capacity of an alfalfa plant depends upon several factors. It depends upon the height of the plant, the number of the branches and stalks, the leafiness, the rapidity with which a plant recovers after having been cut, and so on. If we walk through any field of variegated alfalfa and pay a little attention to the different plants, we must necessarily observe that there are practically no two plants alike. In any field of variegated alfalfa thousands of different types can be found and by studying these individual types from season to season, from spring to fall, we will soon find that some of these types are much superior to others. Is there anything in that? Can we make anything out of that observation? We certainly can, because it has been proven that such characteristics are more or less hereditary; that is to say their peculiar characteristics can be transmitted through the seed from one mother plant to the progeny. By selection in a field of variegated alfalfa of such superior types we can be sure of being able to produce within a comparatively short time a new variety—we may call it so—or a new strain—we may call it a strain—of variegated alfalfas superior to the original.

But how about the seed producing capacity of variegated alfalfa? Variegated alfalfa is a hybrid—a cross between two species, as has been mentioned before, and like most hybrids it has a tendency to be more or less sterile. This tendency is increased by the fact that yellow lucerne, one of the parents, very often is more or less sterile itself. I know of districts in Europe where yellow lucerne produces practically no seed at all, and I have often collected many forms of this yellow lucerne that were practically sterile; they had no pollen. The same plants were females only. And I have also seen plants where the pistils in which the seeds are formed, were almost rudimentary. This fact, that the yellow lucerne itself very often has a tendency to be sterile, and the fact that variegated alfalfa is a cross, helps us to explain why we often find in variegated alfalfa a tendency to sterility. We have it but only in certain individuals. We can have two plants growing side by side of which one is loaded with seed whereas the other one has only a little. It is a noteworthy fact that a plant which

seeds heavily generally produces a progeny which also seeds heavily, and consequently by selecting those plants which seed heavily we shall be able to produce, maybe within four or six years, a variety that seeds heavily.

These two facts, namely, that in variegated alfalfa there is a possibility of increasing the forage yielding capacity as well as increasing the seed producing capacity should be taken into consideration, I think, by members of the Canadian Seed Growers' Association before alfalfa seed raising is started.

As already explained, variegated alfalfa is a cross between ordinary alfalfa and yellow lucerne. Prof. Zavitz described the yellow lucerne as a plant that was very often decumbent, sometimes creeping and somewhat woodier, whereas the ordinary alfalfa is upright in growth. Consequently if we have a cross between the yellow lucerne with its tendency to be woody, and the ordinary alfalfa, the cross is likely to be a little inferior to ordinary alfalfa. As a matter of fact, I think it is so, as a rule. Americans working for the Bureau of Plant Industry have studied this question most carefully and I think it was Dr. Westgate who in a Bulletin issued in 1912 stated that the amount of yellow lucerne discernible in variegated alfalfa was five or ten per cent. If it went below that percentage, the quality of the variety was decreased. This statement that only five or ten per cent of yellow lucerne is discernible may lead us to think that if we could produce a hardy variety of ordinary alfalfa that variety might be better than any variety now known of variegated alfalfa. I think it is a little too early to state whether such a strain can be produced in Canada but I think it can. One reason why ordinary alfalfa is not hardy is that it comes from a comparatively warm climate; but we must remember it grows in that climate not only in the valleys, but high up in the mountains, and for the mountains we have forms that really must be about as hardy as certain varieties of yellow lucerne growing in the flat country. I think that the Canadian Seed Growers' Association when taking up the raising of alfalfa seed should try not only to produce superior strains from variegated alfalfa, but also try to produce new strains from ordinary alfalfa. I think it would meet with success.

MR. RAYNOR: I would like to relate an observation I made last summer regarding the hardiness of different alfalfas. A farmer about seven or eight miles out of Hamilton two years ago this spring ordered alfalfa seed from a local seed merchant for which he paid $12 per bushel. As he lacked seed enough to sow the whole area which he had prepared for alfalfa he procured some home grown seed from a neighbor. This was probably common alfalfa which had become acclimatized in the locality. Last spring he thought he had a splendid promise for a big cut of alfalfa on the main field, but when he came to cut his crop he found that the great bulk of it was nothing but sweet clover. The true alfalfa had practically disappeared, excepting on the half acre sown with the locally grown seed. From that he cut two tons to the acre of splendid alfalfa.

I think that we cannot lay too much emphasis upon this point of getting the right kind of alfalfa seed.

Throughout Eastern Ontario last year the alfalfa crop was practically annihilated by frost. Near Morrisburg there was a plot of Ontario variegated alfalfa sown by the District Representative of Agriculture which stood well when all the surrounding fields were winter killed. That is pretty good evidence of the hardiness of the Ontario variegated variety. In the vicinity of Napanee quite a lot of alfalfa seed was produced last year, while along the Bay of Quinte there was never such a good crop of alfalfa. Nine years ago I bought a bag of alfalfa seed grown in the Grand River Valley, and sowed it on six acres. Last year, the eighth year, it gave the best cut it ever did. That is the source from which we will obtain our alfalfa seed if we can get it.

What can the Rural Schools do to Promote an Active Interest in the Production of Pure Seed in Canada.

(By Prof. S. B. McCready, O.A.C., Guelph, Ont.)

It does not seem out of place at the tenth anniversary of your Association to spend a little time in the consideration of this matter that has been placed in my hands, viz.—"What the rural schools can do in aiding the production of pure seed," because your Seed Growers' Association had its beginning as an educational enterprise with school children or those who where just out of school. And at this time, the third of a generation after your commencement, the discussion may bring up memories of childhood, and lead to a measure of rejuvenation. It seems to me, as Director of Agricultural Education in the Province of Ontario, that there are great possibilities lying before your Association in an educational enterprise with the schools.

This question of agricultural education or the teaching of agriculture in schools is one that, to my mind at least, has no less of romance in it than your story of Alfalfa or your story of the beginning and growth of the Canadian Seed Growers' Association. So far as I have been able to delve into its past history, the beginnings of it in our country, in Ontario at least, were away back in 1847, when Dr. Egerton Ryerson, one of our great makers of Canada, a seer amongst us, had the privilege of founding our system of public instruction. As a foundation for that he, acting for the Government of course, commenced the scheme of teacher-training in a Normal School located at Toronto sixty-seven years ago, and for this work of teacher-training brought out from Ireland two schoolmasters who were, I suppose, specially selected because of their good work in that country. Mr. Hind was the Mathematical and Science Master, and every day throughout the early years of the Normal School work in Toronto he gave a lesson in agriculture to the teachers in training. It was along the lines chiefly of agricultural chemistry. During the second year—that would be 1848, sixty-six years ago—he had on the school grounds in connection with their model training school a small experimental farm in which he carried on something over fifty experiments, testing different kinds of manures, different varieties of crops, and different methods of cultivation. And Ryerson intended that this scheme of work should be taken out into the country places of Ontario along those lines. The scheme was evidently one considered desirable at the time. Lord Elgin, the Governor-General of the Dominion, gave prizes to the teachers in training who took the best marks on the subject. There was an examination at the end of the term—a written paper. I saw a copy of one of the old papers; it had about sixty questions on it. It was about that long (indicating), and contained questions which, so far as I know about papers at the Agricultural College, were right up to date about all these matters that I have referred to. And there was an oral examination too, at their public closing in the Normal School. The candidates had to take their places on the platform and be quizzed by their teachers and visitors and for this competition for the best marks in this double examination, Lord Elgin gave prizes: £5 to the first, and £3 to the second.

We are just at that place now. We are just at that scheme now in Ontario and throughout Canada. I do not need to tell you that the scheme never got into action. It never became incorporated in our system of public instruction. Ryerson went up and down the country urging people to get these trained teachers for their schools urging that they introduce this agriculture into the school-work. Realizing the needs of the country people, he wanted them to take up this work; and the result was as you all know, of course, that it was not acceptable. That is the beginning of agricultural education so far as I have been able to discover it in Canada. A very sensible kind of beginning,

and filled with all sorts of potentialities, it seems to me. Supposing that it had been accepted! Supposing that Ontario—and that would have meant practically all of Canada, because all the Western Provinces have followed Ontario's scheme of public instruction, and our system has affected the other systems considerably too—had accepted that, and that the people living in the country had insisted on having those specially trained teachers for their country schools who would teach this work in this way, and had continued to demand those men for their country schools, to teach this thing in this way! Don't you see that we would never have had anything like the rural problem that we have to-day? Because this question of education is at the bottom of it all, or very largely, this question of the schoolmaster in the country school teaching things in the right way and teaching the right kind of things. And that was the right kind of way, and those were the right kind of things, and that was the kind of teacher that should have been retained for our country schools and that has been lost.

Ryerson, however never gave up the idea of having agriculture taught to country people, and to him is the honour of preparing the first text book for use in our public schools. This (indicating) is a copy of the little book "First lessons in Agriculture for Canadian Farmers and Their Families," by Egerton Ryerson, 1870—forty-four years old. This book was authorized and used in the schools in the seventies—an old-fashioned book in many ways, constructed on the catechism style; he asks a question and then answers it. And I presume that the poor pupils in those days had to keep their heads down and hold them down and memorize the answers to these questions, possibly memorizing the question too. This particular book that I have in my hands is a second-hand copy which I got out of a second-hand store in Toronto, and bears the names of three members of a family in York. The dates show that one had it in 1871, another had it in 1875, and another had it in 1877. The book shows some signs of use—not too much, but some. There are up-to-date chapters on Domestic Science, on Breadmaking, Dairying and things like that. Eighteen-seventy—forty four-years ago—and didn't "go"—never became fixed at any rate. I cannot give you the whole history of the attempt.

This (indicating) is the second book that appeared in Ontario; written by Mills and Shaw—Dr. Mills, former President of the O.A.C., and Mr. Thos. Shaw, one of the Professors there. This book was published in 1890, authorized and used in the schools and, I understand, was objected to because of its being too technical—a little too difficult.

Dr. C. C. James prepared a book afterwards, I believe, at the request of the Department of Education and this (indicating) is a copy of it, 'James' Agriculture'—a splendid little book, authorized in the schools and made compulsory in 1898, sixteen years ago. The upper classes of the Public Schools of Ontario had to use this text book. The Fourth class was compelled to study lessons out of it—to take their agriculture out of it. For the classes below that instruction was to be given by conversation lessons. It is rather interesting to note that this book at the present time is the second most widely used text-book, as a public school text, I believe, in North America. A few years ago it was the most widely used. It is the text-book authorized—I do not know how much it is used—but authorized for use in quite a number of our Provinces and used considerably in some of the States. Very recently however a new book called "Mann's Beginnings in Agriculture" has appeared and has superseded it to a large extent in some of the schools in the United States. We had it from about 1895 to somewhere about 1900 as our text-book, and it is still a book which is permissible in the schools, although not made compulsory.

You have then in these three little books a large part of the history of agricultural education for Ontario—an attempt to have the instruction on this subject given to the children in the rural schools by means of the teacher

and the book; and in every case they had their short day and ceased to be used. If you ask me why, I do not know that I can answer it entirely to even my own satisfaction, except this, that there has never been any demand for it from within; that the people for whom the Departments of Education have sought to give this service through the school have not wanted it, have in many cases been directly opposed to it. We could have agriculture taught in the schools of Canada to-morrow—and by that I mean in the next few years, within five years—we could have the schools of Canada teaching a pretty good quality of agriculture if the people wanted it and asked for it and helped the teachers to give it, and backed up the Departments of Education in giving it. There has never been any demand in our country from within, although right from the very beginning the founder of our system of public instruction wanted to have agriculture taught. Listen to these prophetic words in Dr. Ryerson's preface: "Identified as I am by birth and early education with the agricultural population of the country, (he was brought up in Charlotteville Township, Norfolk County) I regret to see so many of our agricultural youth leave the noblest of earthly employments and the most independent of social pursuits for the professions, the counting room, and wharehouse and even for petty clerkships and little shops. I know that persons in public offices and inhabitants of cities and towns who have no farms must for the most part bring up their sons to other employments than that of agriculture"— and so on, writing about forty-four years ago. They had this rural problem then, this drift to the town. "A boy's leaving the farm because he has or is acquiring a good education is an assumption or admission by all consenting parties that the farmer does not need such an education; and as long as this error is admitted, by farmers not being educated, agriculture will be looked down upon instead of being looked up to, as a pursuit for educated men. Politicians are accustomed to call farmers, by way of compliment, the bone and sinew of the land; and bone and sinew they will remain, and never be anything else, without education. It is a supreme law, illustrated by all history, that *head* rules *muscle*; and all farmers who educate only their muscles and not their heads must occupy the inferior relation of muscle." And so on—an appeal for not only agricultural education but better education of the country people all through.

As far as my experience has gone in this endeavour, the failure to get this work taught is very largely because farmers do not understand what is meant by teaching agriculture. They think that it is teaching farming, and say so, talk so. I was at quite a large teachers' convention a few weeks ago in Essex County and talking with one of the trustees he said, "We have discussed this matter at our Trustee meeting and we have decided that we won't have agriculture taught in our school," and then he quoted one of the other trustees, evidently the dominating trustee of the board; "'So-and so thought he could teach his boy all the farming he needed to know, and he didn't see how the school-teacher could teach his boy anything about farming.'" And wherever you go amongst trustee meetings you will run across that idea of teaching farming. The men, I suppose, have got the idea that farming is ploughing, harrowing, seeding and harvesting and the manual operations. That is not the conception, it never was the idea involved in the teaching of agriculture. What the teaching of agriculture professes to be able to do is to develop this part (indicating the head) of the farming occupation—the part up above the shoulders. Success in farming, success in agriculture, is not dependent primarily upon manual operations—the ability to plough well, or harrow well, or harvest well, or seed well. There will always be hard work with farming, of course; it will be a sorry day for the race when there will not; but the thing that makes for happiness and success is the ability to reason well, to observe closely, to read about your work, to think about your work, to be happy in your work, to be interested in your work, to want to improve in your work—that is what will make for

success and that is what the schools may do; may lead children to think about this farm life, to be proud of farm life, to want to read about farm life and farm operations.

And that brings me to the late development of agricultural teaching. We have no text-book in Ontario prescribed for this subject. They have it in some of the other Provinces, and they have it in some of the States. Only recently, in fact, some of the United States, quite a number of them, have placed agriculture on the list of obligatory subjects, as we had it in 1898. A great many of their educationists—I think unwisely—have been going ahead of the people again, and have been trying to get something done the people do not want done, and which teachers are not prepared to do. In Ontario the subject is not now compulsory, nor has it been for a long time, and it is not based on the use of the book.

It is sought however to do this now through this new thing called "Nature Study," a subject—so far as it is a subject—that has come into the world of education since a little before the close of the last century. All over the civilized world, in the last fifteen years or so there has been a great development along the line of Nature Study. Practically every country has incorporated it into its course of studies and the work is being taught to teachers in training. Nature Study has come in as a kind of protest against the artificialities of school work. We had apparently come to a place where all the out-of-doors was left out of a child's education, as it were; as if the idea of education had narrowed down to a thing which you could only get inside of your four walls, with the teacher and the blackboard and the book. A failure to realize that children are educated in a very large measure by quite other factors apart from teachers and books and blackboards and schools; that every day of their lives, in their touch with their neighbors and with their environment, they are being educated; that nature, the great nurse, is one always, and always will be one of the great educators, one of the great teachers of the child.

And so this Nature Study has come to naturalize school work, to bring the out-of-doors into the schools—or rather bring the school out of doors, realizing that the things that lie all around are the things that the child comes into contact with every day—his experiences at home, along the road to school, on the way back again, with his father in the field, with his mother milking or when she is feeding the chickens—all those things make a basis for education of the soundest kind.

That is something of the meaning of Nature Study. And the method of it is also natural; not through a book; not telling the child to go and get up a lesson in a book, which we will hear to-morrow at a certain time; but inciting the child to go out and learn for himself in the book of nature, and using it to-morrow in the child's composition, or drawing, or arithmetic, or whatever it may be. That is the method—a naturalizing of the material in the school and of the method in the school. And wherever good teachers have come into a proper use of this thing they have found a new joy in teaching. That is the universal discovery by teachers where the work is sensibly taught. They get close to the children. They get a new connection with the home. They get a new spirit in the school. They get the pupils to want to read. They get them thinking. It makes for good in every direction in school life. And Nature Study is nothing but agriculture when it is a sensible kind of Nature Study, because so far as the elements of the subject are concerned it deals with plants and animals and soils and weather, the elements in agriculture—plants and animals and soils and weather. And so we have come into a scheme of the teaching of agriculture in a natural way—the way the race has, as it were, been taught in agriculture; through work with plants and with animals and with soils and helped or hindered by the weather.

So that is the agriculture of the present time which we are trying to develop in Ontario and all over the world. The method is the same throughout the continent and in other places.

Now I must not take very much more of your time, but I should like to call your attention to the fact that teaching agriculture in that way brings the work of the Canadian Seed Growers' Association into great possibilities in school work. I have in my hands here the course of study that we use in Ontario. It is not very different from what is used in any other country. This particular sheet (indicating) is printed at the back of the school registers used in our schools, and a great many teachers are following it. We are making headway slowly. We have up-to-date, in Ontario a little over 250 schools that have formally undertaken to teach agriculture. Last year we had 175; the year before 117; the year before 33; and year before 17. We are a long way from getting it into the 6,500 schools, but if it increases at the same rate we should see great developments in the next ten years, and possibly that is fast enough. Every subject has to fight its way into a school programme and I suppose a slow steady fight is the best kind of fight, everybody's feelings being considered.

Here are some of the topics which are suggested to teachers as suitable things for taking up with their children:

"*Pupils' Progress Clubs*"—Under the heading of "the month of January" it is suggested that teachers might organize the pupils in their upper classes into what we have called here "Progress Clubs"—children's clubs. That has had great development throughout the United States, and it is making a great development in Canada as well, It takes many different forms. You can understand how a teacher might have half a dozen children in the Third or Fourth book and might get them to organize into a Poultry Club or an Oat Club, or an Alfalfa Club—we have had all these kinds in the country the last few years—and let them to a very large extent teach themselves. That is, the teacher does not need to be a poultry expert, nor alfalfa expert to get good teaching for her pupils in these things. The thing she will supply chiefly will be the enthusiasm and the direction.

Teachers tell me of their club's operations. I know one school where they have two clubs; the girls have a Domestic Science Club, and the boys have a Potato Club, and on Friday afternoon, when the boys are having this agriculture lesson the girls in the Domestic Science Club go to one corner of the room and hold their little meeting, in which they read papers. Each week the teacher gives the children a recipe to work out at home, and then, the following Friday they discuss their experiment in cooking at home, and the Secretary takes down the minutes. The teachers, I suppose give them some help in conducting the meeting. The boys in their corner of the room, are having their little meeting on potato growing, and it may be something read out of a paper or a composition a boy wrote himself, or something he has read from a book, which is given, the practical work being done in the growing of potatoes at home, in little plots.

Here is a letter I got the other day from a teacher not far from Ottawa, which illustrates the possibilities of this kind of work with children. She says:

> "Pardon my troubling you, but I feel that I must tell you of our success. We started giving agricultural instruction in January, and the children would not give up the work now, they have become so alive and interested, especially in the poultry work"—

This girl took charge of this rather backward school last summer, in a place where they needed a good, live teacher very much.

> —They work better, too, at their other subjects."

That is a universal experience of teachers in this work. As soon as they start the children in Nature Study or Agricultural Nature Study work they get them going in all other lines of school work. It is the leaven that leavens the whole lump.

> —"They work better too at their other subjects. Our bulletin board is full all the time, with fresh clippings from papers and magazines, items on such topics as "How to Feed Chickens," "How to Kill Lice on Hens," "How many insects will a bird eat at a meal," etc. Our bulletins are wearing out and the girls are forced to do bookbinding," etc.

Then she speaks about getting more bulletins.

> "Our agricultural concert was a grand success every way. People said there was never such a good concert in the Town Hall. Dr. Brown made an excellent chairman and Mr. Tennant, District Representative of Agriculture for Renfrew, was with us and addressed the audience. He reached a number of people and made them think We are using the proceeds to buy hose, sprinklers, etc., and to start our agricultural book shelf. I wrote to the Lee Manufacturing Company of Pembroke asking if they would send us a machine and they answered to the effect that they would loan us one for the spring months. Several of my boys are much taken with poultry work and one boy who has been very dissatisfied with home and school,—so much so that he wanted to go away last fall and work in a shanty—came to me at recess the other day and said 'I am coaxing dad to get me an incubator this spring. I have got thirteen hens, and I am going to sow wheat in that field back of the house for them. Guess I won't go away this summer.' This boy is 16, and only in the Entrance class."

She caught that boy with chickens, some catch with oats some with alfalfa, and some with flower growing. It does not make much difference what they are caught with, but the big part in teaching agriculture is *catching the boy* to start him. He will teach himself afterwards, largely. You can see that. Get him once interested about poultry keeping and you cannot keep him from reading and studying about poultry; you cannot help but have him interested in growing wheat and producing feed for his hens and a hundred other things that may be more or less directly connected with poultry keeping.

In the month of February, this topic is suggested for the teachers:

> "Plant Studies before germination tests of seed to be sown on local farms—structure of little plants—effects of light, heat and moisture on growth."

That is, it is suggested to the teacher that she will have the pupils bring in from their homes samples of seeds they may be thinking of buying, or samples of seed they expect to sow and have them tested in the school. And the instruction goes on until the boy finds weed seeds in his seed, and if he does not know their names he will send them to Mr Clark, making the letter he has written to Mr. Clark, you see, a composition letter, and hook ng the boy up with the Seed Commissioner's office in Ottawa. That is good teaching in agriculture. The teacher may not know weed seeds but she starts them in learning.

In March this topic is suggested:

> "Plant studies—estimation of weed seed impurities in seed to be sown locally—testing seed for germinability," etc.

A number of schools do quite a lot of work in this connection—testing seed for sowing.

Then in the summer time they will have their plots at home. Where the community is behind the scheme and understands it well, we would have them have a few plots at the school, to start with. We urge all the teachers always to have it carried out as a home project—to have the boys grow their alfalfa, their oats, their mangels, their turnips or whatever it may be at home, the teacher visiting the home to see these plots. But when it comes to a time when the people understand the scheme and realize that these things are a basis for instruction in the schools, then they might have a few square rods on the school grounds devoted to experimental work.

Just imagine what could be done if every one of our 6,500 country schools in Ontario had a little piece of ground—not very big—on which they might demonstrate some of this Ontario Variegated alfalfa or Grimm's, or some of the O.A.C. No. 21 barley, and that sort of thing. The children do the work and the community benefit by it directly. It is being done, too; that is the beauty of it. One school teacher down in Kent County last year got a sample of seed from our Schools' Division of the Experimental Union—O.A.C. No. 72—and he had a crop which bore at the rate of 110 bushels to the acre. It was a fine sample of seed. The average crop in that district on the farms was somewhere around 50 bushels; at least the maximum reached on the ordinary farm was about 50 bushels to the acre. I know of several cases where a little sample of choice Ontario variegated alfalfa has demonstrated itself as the best kind of alfalfa. I know of some cases—a teacher told me of one not long ago down in Norfolk County, where they took some hand-picked, specially selected O.A.C. No. 21 barley—we only send out a few ounces of it—and it was the basis of a very large crop, and the best barley in the district. Last year we sent out Wisconsin No. 7 corn. We get our seed always from the Seed Growers' Association members, and the best seed we can get; this particular seed we got from the man who took first place for his field crop and first place at the Provincial show, for his corn. It was the best Wisconsin No. 7 that we could find in Ontario; and from all the reports that we have received we find that it has beaten, and it has proven itself superior to anything ordinarily grown in the neighbourhood. And all through the children's work. Near Chatham there were boys who, using this seed—the product of your seed grower's fields—who beat the county on yield. We got some splendid reports from the seed Mr. Lockie Wilson gave us a year ago. It was the "Yellow Russian Oat" that took first prize in the field competition in this part of Ontario and the seed took first prize at the Winter Fair. He gave me a bushel, and I have sent it over Ontario and in many cases reports come back of the excellent results of that seed as compared with others grown in the neighborhood. The possibilities of the improvement of crops through joining up your Seed Growers' Association and all the other organizations are immense, through the schools and the children. That is one of the things I aim at as Director of this work, to have every agricultural organization co-operating in this work in the schools. There are the agricultural societies; they have great possibilities. They could help a great deal; and the horticultural societies, and the seed growing associations, and the field crop competitions and the district representatives, and the agricultural colleges and all the different organizations that we have for agricultural education for grown-ups.

You see, then, how the teachers of agriculture as prescribed for the Ontario schools fits in very directly with your work as a Seed Growers' Association. We have schemes of agricultural education in our high schools, too. You may be surprised to know that it is under development. We have not anything like the showing that we have in the public schools, but a good commencement has been made. The district representatives all over Ontario are doing good work in this connection, teaching agriculture in the high schools, chiefly in short courses. They get the older pupils in, from 18 to 25 years of age, for

a month or six weeks or possibly a shorter term. The Department of Education besides encouraging this work is trying to adjust its high school subjects and high school work so that the Science teachers in the schools may also share in this work. Last year, at Guelph, there was a class of twenty-one high school teachers training for this work. They will come back for another course this summer and be certificated as teachers of agriculture. Five schools have commenced the work. Our hope is, of course, it will go into the smaller high schools and continuation schools in country villages. Ridgeway, Essex, Arthur, Drayton and Weston are teaching agriculture in this way now.

The scheme is somewhat similar to the Nature Study scheme for the public schools. The teacher takes the work up in the schools. basing the instruction on practical work carried out by the children. The scheme is the common one that you will find in operation for teaching agriculture in the rural schools everywhere; that is, basing the instruction on the project that the pupil will carry on at home. This circular describes the work for the Ontario schools. Here is a list of the projects that might be selected by the pupil for carrying out at home, and here are a few of them:

"To produce one's own mangel, turnip or carrot seed."—Supposing a boy wanted to grow mangel seed at home, then he will be allowed that as his project to carry out at home.

"To test and introduce a new variety of grain, alfalfa, clover, potato or other crop, such as recommended by the experimental stations."

"To enter local competition in obtaining the best yields from one-tenth-acre of corn, potatoes, turnips, etc."

"On crop and live stock improvement—To join the Seed Growers' Association and to commence practical seed selection and improvement."

"To commence the selection of the best hills of potatoes, best ears of corn, best heads of oats, and growing crops from these."

Etc., etc.

But here is the idea: Suppose in any one of those schools I mentioned —at Weston, we will say—the Science teacher organized his boys into a branch of your Seed Growers' Association and had as many of the boys at least as wanted to, join. It would not be well to force a boy to do something he did not want to do. Some boy might want as his home project the cleaning up of the old orchard or the building of a new hen-house, or the improvement of the roads around the farm, or the putting of a ventilation system into the barn, or something like that. Any of these are permissible—but supposing he interested fifteen of the boys in Weston High School who would like to start on crop improvment, and he organized them as a branch of your Canadian Seed Growers' Association under Mr. Newman—if Mr. Newman's duties would permit him to join up with the schools—and that your inspector would go around to Weston and address the boys and go out to their homes and help the teacher to train them. The regulations would permit the teacher to hire a horse. All expenses are paid for anybody who goes out and inspects this work of the children at their homes, and $100 is allowed for the carrying on of the work. If you could have in these continuation schools and small rural schools a connection with the Science teacher and have the boys and girls organize a juvenile or junior branch of the Seed Growers' Association possibly operated on somewhat the same lines as your Corn Growers' Association down in Essex and Kent do you not see what you could do? It would not take very many years to bring on a few thousand of the best trained crop-improvers that you could have, I think, in any country.

There are possibilities in the work in the public school and in the high school. The chief thing needed however is for the people to understand the scheme and to want it. Just as soon as the people want it for the children they will get it. The Education Department favours it, pays special grants for carrying

it out, sets an examination on it and marks made on the paper on agriculture are added to the pupil's marks for his certificates. So the chief need is this desire on the part of the people.

I have a few reports here from teachers. They have to send in reports at the end of the year to the Department of Education, showing what they have been doing. Here is a teacher from Glengarry county who sent us this report just a few weeks ago. She had a school garden where she had a few little experimental plots in which they were testing some of these choice varieties of seed sent out: "Many of the farmers did not know the name of the variety of grains they were showing. It was just 'oats,' just 'wheat' just 'barley.' I think improvement was made here."

On the school plots they could see what No. 72 oats was, they could see what No. 21 barley was and could see what Variegated alfalfa was, and so on. So, while the children were learning from this experiment the neighbourhood at large was being greatly benefited too.

Here is a teacher from Huron county who says:

"The work has been valuable (1) in creating an interest in gardening, (2) in teaching the pupils to take care of property, (3) in arousing the people of this section to take an interest in our school and surroundings. We hope next year to make our garden an experimental station for the section, and trust we have laid the foundation for that this year."

Here is a teacher in Bruce county who carried on the work under a children's club and who reports a good deal of the seed that was sent out showing better results than the seed ordinarily grown in the neighborhood. Here is his comment on this problem of agricultural education, and I think it indicates what I have tried to show you.

"It appears to be a matter solely of getting parents interested in agriculture. They appear to think boys and girls have too much to study at school and doubtless not without reason. They appear to conclude that so much is crowded into the school curriculum that the only way for the boy to learn farming is to stay at home and work on the farm. Consequently our school is made up principally of girls—we have 13 boys and 36 girls. Doubtless boys stay at home because the schools do not furnish them with the education they require for farm life."

This is in a small country village where most of the pupils are from farm homes. One can easily imagine that if we could get this kind of agriculture taught in this sensible way, co-operating with the Seed Growers' Association, we would soon have quite a different kind of sentiment prevailing throughout the country on the part of the farmers, for this desirable thing; and it would not only be in agriculture that the benefit would be felt, but all school interests, all rural life would be greatly benefited. The hope for better rural schools, the hope for better rural education for country people lies in getting into the school work something like this, which will grip the attention of the people and make them believe that education is worth while.

Field Crop Competitions and their Value in Connection with the Good Seed Movement.

(Address by J. Lockie Wilson, Toronto, Ont.)

I shall endeavour to state very briefly what has been accomplished through standing field crop competitions in Ontario. There is no great romance about this story of mine, such as would apply to Dr. Robertson's work in the years gone by, but if it were not for the efforts in the past of men of a similarly broad outlook, the field crop competitions in the province of Ontario would not have been the means of accomplishing so much as they have.

Field crop competitions were inaugurated in Ontario in 1907 by my branch of the Department of Agriculture, and the Hon. Nelson Monteith, then Provincial Minister of Agriculture, placed $1,000 in the estimates to be distributed among the first ten societies making entry. Of this amount $100 was allotted to each society for prizes. The Dominion Seed Commissioner furnished the judges, and 325 farmers entered. In 1908 the number of societies entering increased from 10 to 46. There were 77 in 1909; over 100 societies in 1910 and 1911; 153 in 1912 and in 1913 200 societies entered, but, owing to the unusually bad weather conditions affecting the crops in that year, only 159 societies' fields were judged. We had, as I said, 325 farmers in 1907, and in 1913, 3,500 farmers in different parts of this province entered in these field crop competitions. Three thousand acres were judged in 1907, and 35,000 acres in 1913. While 5 judges were able to do the work in 1907, 100 judges were required in 1913. Owing to the fact that the crops ripen about the same time in different sections of the province, no judge can inspect more than two societies' fields, and some societies have as many as forty entered.

The Governement grant in 1907 was $1,000; in 1908, $3,000; in 1909, $7,000; in 1911, $7,500, and in 1913, $18,500; and in 1914, through the good offices of the Hon. Mr. Burrell and Mr. Clark, the Dominion Seed Commissioner, we shall have, including the Ontario Government's grant, $24,500 for the standing field crop competitions in the province of Ontario, and altogether for the seed fairs and the standing field crop competitions in 1914, $26,000. Of this amount, the Federal Government grant is $16,500. Judges' services and expenses in the field crop work last year amounted to $8,500.

The plan adopted by the department is to make a grant of $50 to an Agricultural Society for each variety of crop entered, but they are limited to three kinds of crops, and the Society is obliged to contribute $25, making the total prize money $75 for each crop that has to be paid to the prize winners in the standing field crop competitions. A form of application is sent to the Society, which reads as follows:—

STANDING FIELD CROP COMPETITIONS.

Conducted by the Agricultural Societies' Branch of the Ontario Department of Agriculture.

Entry Form for Agricultural Society.

J. LOCKIE WILSON,
Superintendent of Agricultural Societies,
Parliament Buildings, Toronto.

DEAR SIR,—The .....Agricultural Society, after having given due consideration to the rules governing field crop competitions, as submitted by you, has decided to undertake the holding of a competition along the proposed lines. It, therefore, applies for financial assistance which is offered by the Ontario Government, and agrees to conduct the competition to the best of its ability and to take every opportunity to give publicity to the work through the press and otherwise.

The variety of crops with which we wish to compete is:—

(1).....
(2).....
(3).....

The number of members who have decided definitely to enter is, at present, for crop (1)....., for crop (2)....., and for crop (3)..... The names of these, together with those who may decide later, will be forwarded to you before the 25th May on the blanks which you have offered to supply to us for this purpose.

Immediately upon your acceptance of this application we agree to give public notice through the local press by publishing the rules above mentioned and urging as many members as possible to enter. Those desiring to do so will be requested to apply to me, the secretary of this Society, for further advice and for application forms.

(Signed).....
Secretary.

Dated this..... day of.....
at.....P.O.

STANDING FIELD CROP COMPETITIONS.

Conducted by Agricultural Societies' Branch of the Ontario Department of Agriculture.

Entry Form for Individual Competitor.

To the Secretary,
.....Agricultural Society.
..... P.O.

DEAR SIR,—I hereby make entry in the field crop competition which is being conducted by the ..... Agricultural Society. I agree to comply with all rules regarding the competition which will affect me and with which I have acquainted myself. I hereby declare that I have not made entry in any other society's competition.

I shall compete with.....variety of .....
The location of my farm is as follows:
Post Office .....County .....
Township.....Concession.....Lot.....

(Signed).....
Entry Fee.....
Address.....

The Board of Directors select the kind of grain that they intend to compete with and their members entering sign the individual entry forms which are first sent to the secretary, who forwards them to me. Each Society must have not ess than ten entries. I keep in very close touch with all the Secretaries in the province, and four or five days previous to the time that the crop in a locality is ready to be judged, I telephone or wire the judge to be at that particular place and meet the secretary on a certain day.

This field crop work has grown so rapidly that it is difficult to get enough qualified judges to go round. Each year we arrange to have our judges go to the Guelph College and to the Central Experimental Farm, Ottawa, and take a short judging course in the grain fields of those splendidly managed institutions, and, with capable expert instructors, valuable results are achieved. The railway fare and hotel bills of these judges are paid by the Ontario Government. Great assistance has been rendered by the professors and experts at the above named institutions.

Score cards are supplied to the judges, of which the following is a sample.:

ONTARIO DEPARTMENT OF AGRICULTURE.

AGRICULTURAL SOCIETIES' BRANCH.

STANDING FIELD CROP COMPETITIONS.

Score Card for Wheat, Oats, Barley and Rye.

Competitor's No..... Mr.....

Agricultural Society.....County.....

P.O. Address.....

Name of Variety.....

	Possible Score.	Judge's Score.
1. General appearance considering:—		
(*a*) Stand of crop.....	5	
(*b*) Type of plant, vigor and uniformity of growth.	10	
(*c*) Method of seeding, absence of lodging.....	5	
2. Freedom from weeds.....	25	
Comments regarding weeds found in crops—		
.....		
.....		
3. Freedom from smut, rust, blight and insects.....	10	
4. Freedom from other varieties and other kinds of grain.	20	
5. Yield and quality of grain considering:—		
(*a*) Proportion of well-filled heads of plump grain of good quality.....	20	
(*b*) Uniformity of maturity.....	5	
Total.....	100	

.....

Judge.

The object of these short courses is to arrive at a uniform system of judging. We found, however, that one day was rather short, so last year we had a two days' judging course, the judges west of York and Simcoe convening at the Guelph Agricultural College, while those east of those counties assembled at the Central Experimental Farm, Ottawa.

Judging is done by score card, and a careful record is kept of the various kinds of weeds found in the fields in the different parts of the province. The judge is also required to inform the competitors as to the best methods of exterminating weeds and destroying fungus diseases. Some judges score a little higher than others, but this does not make any difference so far as the local competition is concerned, because the one judge scores all the fields entered by a given society. In making a comparison, however, between the scores of the various societies as published in the annual report, many thousand copies of which are distributed, if one judge scores high in one society and another low in another society, an apparent injustice is done to the farmers in the locality receiving the low scores, although their grain may be equally good. Marked improvement, however, is being shown each year in this regard, and we hope soon to have a relatively uniform system of scoring throughout the province.

The following are the rules and regulations I have adopted for the guidance of the Directors of our Agricultural Societies:—

RULES AND REGULATIONS OF THE STANDING FIELD CROP COMPETITIONS, 1914.

The Ontario Government has given a grant of $24,500 for the standing field crop competitions to be conducted under the auspices of the Boards of Directors of Agricultural Societies.

1. NATURE OF COMPETITION.—Societies are this year allowed to enter in three kinds of crops which must be selected by the Board of Directors. Fields entered for each competition must consist of not less than five acres nor more than twenty, in one block; but for beans, potatoes, mangels, turnips or alfalfa the minimum plot must be not less than one acre.

Selection must be made from the following crops, viz., Spring or Fall wheat, white oats, barley, rye, corn, peas, alsike clover, alfalfa, red clover, potatoes, mangels, turnips, beans, or any other staple crop produced for seed in Ontario.

2. COMPETITORS.—Competition will be limited to members of an Agricultural Society and fields entered must be not more than fifteen miles from its headquarters. *Competitors will only be allowed to make entry in one society for one, two or three varieties of crop and only one entry can be made by each competitor in each kind of crop.*

3. SOCIETY'S ENTRY.—Societies desiring to enter this competition must notify the Superintendent not later than the first day of May. Not less than ten entries in any society will be accepted and competition will be limited to the first 200 societies applying.

4. INDIVIDUAL ENTRIES.—All individual entries must be forwarded by the Secretaries to the Superintendent of Agricultural Societies, Parliament Buildings, Toronto, on or before May 25, 1914.

5. A society may charge an entry fee of not more than one dollar for each crop entered by a competitor, but this is optional with the Directors.

6. The Government grant to a society will be $50 for each crop, making a total grant of $150, if the society holds a competition in three kinds of crops. This amount must be supplemented by the society to the extent of $25 for each crop competition, making a total of $75 prize money for each crop, but Directors must decide whether they desire to take up one, two or three crops. The total expenditure by a society would be $75, if three crops are selected.

The amount contributed by the society of $25 for each crop can be counted as expenditure for agricultural purposes in the yearly financial statement on which the regular annual grant is based. This will be equivalent to reducing the amount paid by a society to about $17 for each crop. If an entry fee is charged for each crop the net amount paid by a society would be very small, when the large financial benefits received by the members who take part in these competitions is considered.

The total prize money offered must be paid to the winners in full without any deduction.

8. All competitors must be members in good standing of the society in which they make entry and must have paid their membership fee for the year in which the competition takes place.

9. The secretaries of societies should urge competitors in the different crops to select, if possible, the same variety of grain or other crops and to have them sown as nearly as possible during the same week. By so doing the crops will ripen more evenly and the work of the judge be facilitated.

10. JUDGES.—The Ontario Department of Agriculture will furnish judges free of charge.

GRAIN EXHIBIT AT PROVINCIAL WINTER FAIRS.—Substantial cash prizes will be offered by the Government for two-bushel sacks of grain and one and one-half bushels of potatoes, mangels, turnips and corn in the ear at both Ottawa and Guelph Winter Fairs, and also for sheaves, the competition for which will be confined to the first five prize winners in the standing field crop competitions. Full particulars will be furnished later.

SHEAF EXHIBIT AT THE CANADIAN NATIONAL EXIBITION.—In addition to the above, arrangements have been made with the Directors of the Canadian National Exhibition, to be held in Toronto, August 29 to September 14, to donate $300, in prizes for a sheaf exhibit from the standing field crop competition. Those eligible to compete are the first five prize winners. For this sheaf exhibit the province has been divided into three districts, and prizes amounting to $100 will be awarded to the competitors in each of the three divisions mentioned below, for the following kinds of grain:—

	Fall wheat.	Spring wheat.	White oats.	Barley.
First prize	$8.00	$8.00	$8.00	$8.00
Second prize	7.00	7.00	7.00	7.00
Third prize	6.00	6.00	6.00	6.00
Fourth Prize	4.00	4.00	4.00	4.00

Division 1. Includes Muskoka, Parry Sound, Haliburton, Nipissing, Manitoulin, Algoma and other districts in New Ontario.

Division 2. All counties east of York and Simcoe.

Division 3. York, Simcoe and all counties west and southwest of same.

Each sheaf must be not less than eight inches in diameter, be carefully selected from the best grain in the field, neatly bound by hand, packed in a box, lumber in same not more that three-quarters of an inch thick, and box to be not more than two inches longer, wider and deeper than sheaf and shipped to J. Lockie Wilson, Government Building, Exibition Park, Toronto, not later than August 26, 1914.

GRAIN EXHIBIT AT CANADIAN NATIONAL EXHIBITION.—Prizes amounting to $350 will be offered at the Canadian National Exhibition for two-bushel sacks of grain open to the winners of the first five prizes in the standing field crop competitions. In this section, exhibitors will show in three divisions the same as in sheaves. The prizes are as follows:—

	Fall Wheat.	Spring Wheat.	White Oats.	Barley.
First prize	$10.00	$10.00	$10.00	$10.00
Second prize	9.00	9.00	9.00	9.00
Third prize	6.00	6.00	6.00	6.00
Fourth prize	4.00	4.00	4.00	4.00

All entries for the sheaf and grain exhibit must be made to the Superintendent, J. Lockie Wilson, Parliament Buildings, Toronto, not later than August 15, 1914. Express charges on sheaves and grain will be paid by the Ontario Government.

Prizes similar to the above will also be offered at the Canada Central Exhibition, Ottawa, and possibly at the Western Fair, London, for which the five prize winners in these competitions will be eligible.

Grain winning prizes at the above named exhibitions will be retained by the Department of Agriculture for experimental purposes, and that which does not receive an award will be sold to the best possible advantage and the money received for the same will be forwarded to the owner or, if exhibitors wish their grain returned, they can have this done by paying return express charges on same.

J. LOCKIE WILSON,
Superintendent,
Parliament Buildings,
Toronto, Ont.

In the old days the farmers' exhibit of seed grain at an agricultural fair was treated as of little consequence, and trifling prizes were offered. As a consequence the exhibitor brought his grain in sacks that were none too clean, and the same might be said of the grain exhibited. I have seen the same old sack of grain shown for ten long years. In order to prevent this occuring, in the case of a field crop competition, the grain which wins a prize at the large exhibitions in the province is retained by the Department of Agriculture and distributed in different sections of Ontario.

A very great compliment was paid by the Dominion Seed Commissioner to the work I was trying to accomplish when he came back from his extended official visit to the countries of Europe. When asked for suggestions as to the improvement of our standing field crop competitions, he said, "Ontario leads the world in field crop competitions".

Since this field crop competition began, over six hundred bushels of prize winning grain have been distributed to the farmers of Ontario. Those who receive this grain agree to return a similar quantity the following season, to be again passed on to others.

MR. MOORE: Is it only the first prize winners that are eligible to show their seed at the fall and provincial exhibitions?

MR. WILSON: The first five prize winners in the standing field crop competitions are eligible to compete.

The grain that was first sent to these exhibitions contained large quantities of noxious weed seeds and mixed grain, and wild oats were largely in evidence. What are the conditions to-day? In the hundreds of bushels of grain exhibited last fall not one grain of wild oats could be found, and the exhibits were practically free from other noxious weed seeds.

Large financial benefits have accrued to agriculturists all over the province who took part and were successful in winning prizes in these competitions. I could name agricultural societies in this province whose members formerly sold their oats at 40 cents a bushel, but who were enabled through the advertisement received as successful prize winners, to sell them in carload lots as high as $2.50 a bushel. The appendix to the Agricultural Societies' Report printed each year contains the score of every farmer whose field was judged. A friendly rivalry is created, scores are compared, and those whose standing is low have an incentive to procure better seed grain and improve their methods of cultivation so as to beat their neighbours in the next season's competition.

We are endeavouring to get the farmers to specialize and make different sections noted for particular kinds of grain, so that purchasers may be able to buy in carload lots seed grain true to type and name. We are also trying to have those who enter in each society sow their grain about the same time. This will ensure evenness in ripening and the judge will be better able to make satisfactory decisions. If one man sows on the 24th of May and another on the first of June, you can readily understand how difficult it is for a judge to do his work properly. When the Secretary informs me that about three-quarters of the crop in his society is ripe, the judge is sent there and does his work. Sometimes it happens that the grain is cut. When this occurs, the judge cannot score the field

These competitions have resulted in increased prices to the farmers, as I said, and an enlarged demand for the prize winning grain. The work has progressed largely on account of the magnificent money grants given by the Federal Government. Had it not been for this, the work could not have been so greatly extended.

As Secretary-Treasurer of the Ontario Vegetable Growers' Association, I have started field crop competitions under the auspices of that organization. One-quarter acre is the minimum size required for the competition. Last year the different branches over the province selected celery, onions and tomatoes. Large prizes are offered at the larger provincial fairs, and only the prize winners in the local competitions are allowed to exhibit. It is run practically along the same lines as the standing field crop competitions.

In conclusion I wish to congratulate the Dominion Seed Department and the Canadian Seed Growers' Association on the splendid work they are doing on behalf of the farmers. Without the pioneer work conducted by them, our efforts would not have been of much avail. Experimental plots, school gardens, and field crop competitions are all tending to educate and elevate those engaged in the tilling of the soil, and I wish to render a meed of praise to you, Mr. President, for the valuable work you have done and are continuing to do for the farmers of Canada.

THE PRESIDENT: For a long time organized government agencies for the improvement of agriculture assumed that their whole duty was to pour out information through various channels. And a good many people, of short vision and feeble judgment, supposed that that was education. Education is the result of, as it is in itself, a series of experiences. A series of experiences, not a succession of acceptances of statements of information. Now, we find the department helping the farmer to put the instruction, the information he receives, into practice on his farm. He becomes an educated farmer by his

experiences. One of the fine stimuli for progress in education is the feeling of friendly competition with a fellow-student. So while the content of information from the field crop competitions is excellent, the participation in doing, on well ordered lines, is very nourishing. Stimulus, on both the imagination and the will, comes from competition with one's fellows and with other people in the wider and larger competitions of life. I call this a well rounded scheme of agricultural education. If the same principle were applied in the work of the common school, the boy might apply information gained and turn it into a series of experiences; then competition, then further progress into co-operations. Thus we will have a people who will thoroughly provoke one another unto all good works; not by the pouring in and accepting processes, but by the practical applications of knowledge whereby they develop practical ability and co-operating good will.

We appreciate very highly this class of work. One of my wiseacre friends, who hardly knows a strawberry from a raspberry bush, has been warning us against being carried away by what he calls "extravagant idealisms". Extravagant idelaisms? The only extravagance a man ever commits in life, for which he is to be blamed is such excess in selfishness and cynism that he has no ideals, or that they are as lean as a scarecrow from want of blood relationship.

Did you notice that from ten societies the growth has gone up to 150, and that from 3,000 acres there has been an expansion to 35,000 acres, from a few persons up to thousands of farmers? Why? Because people are hungry for that sort of thing. It is not a question of far-off idealism we are talking of when we propose comprehensive plans for the improvement of agricultural education. This is not an idealism remote and impracticable for two hundred years to come, but an idealism that can be realized in the lives of our people within the next ten years if we shape our courses right now—local, provincial and Dominion. Ireland gives an illustration of this—how "extravagant" illustrations become the frugality of national power. In 1899 there were two technical schools in Ireland and a few hundred students taking part in the classes. When our Commission was in Ireland twelve years afterwards, there were sixty technical schools—one of the finest we found in all Europe was at Belfast—and 42,000 pupils enrolled. In addition to that, almost an equal number of students were participating in the benefit of agricultural instruction. That is ten years' growth in Ireland from an "idealism" that, like ours, was anything but "extravagant". I feel that we are now at the threshold of a similarly great opportunity in Canada.

MR. RAYNOR: There is no doubt in my mind of the great value to our province of field crop competitions. In attending seed fairs and in doing some of the practical work in the field, I have had an excellent opportunity to witness the great good they are doing. Valuable as these competitions are, they have failed to accomplish all that we had hoped. They have, for instance, not succeeded in reducing the proportion of fields containing a mixture of different varieties to the extent we would like to see. This fact is due chiefly to the threshing machine and other agencies of distribution including the carelessness of the farmer himself in the matter of cleaning his seed grain properly. At exhibitions we often have to give inferior samples of seed the prize, when other samples are much superior in plumpness and in size, but are simply loaded with some other kinds of grain. That is one defect we should try to obviate. It can be done and is being done in some places, where the farmers who enter the competition secure their seed from some member of the Canadian Seed Growers' Association. When seed of such origin is exhibited it is found to be much purer. The Canadian Seed Growers' Association can therefore be used in that way as a source of seed for competitors.

Of the different varieties of oats that are exhibited, such varieties as the "Lincoln" take the premiums, although this variety is not so high a yielder

as some others such as the Banner. If the prize-list were fixed so that only the best varieties could compete this difficulty might be overcome.

As a judge I found it a splendid thing to show the score card to the competitor. I did not show him the total percentage his field would score, but only the score for the individual features and pointed out wherein his crop was deficient. Some of the judges have not done this, thinking it would be giving away too much information, but if the score card is not totalled up I do not see any danger in showing him just how his field has scored as at no time can you make such an impression on him as at the time the judging is being done.

MR. MOORE: Could you not leave a copy of it with him?

MR. RAYNOR: A copy is left by the judge who examines the fields of members of the Canadian Seed Growers' Association, but a copy could not be left to competitors in field competitions as sometimes it is necessary to readjust the scores after the judging in a given society is completed.

I do not know of any work that has increased the interest in pure seed, in better fanning-mill selection and in making a better preparation of the ground for the production of these crops than has the work connected with the field crop competitions. It is a work that we should encourage and should try to bring before the people in a larger way.

MR. MCLEOD: I have had quite a lot to do in connection with field crop competitions as secretary of an Agricultural Society in the county of Kings, N.B., where a competition has been held each year for the last four years. I was always of the opinion that the exhibitor should be given the full score of his field immediately the judging is completed. With this information before him he might be able to avoid certain mistakes in his fall work.

In our province we award the prizes according to the scores made. Thus in the case of two parties tying with a score of say 90 points it does not make any particular difference, as there is only a few cents difference in the amounts of the prizes. Where there is only one-half or a quarter of a point of difference between two fields, we cannot see our way clear to make a difference of say $3, or $4, or $5, in the prizes.

MR. WILSON: What do you do?

MR. MCLEOD: We pay ten prizes. We pay nothing to an exhibitor making less than 75 points out of the 100. The total scores of the highest ten are added together and the total prize money is then divided in proportion to the scores made. We find it to work out very satisfactorily.

MR. MOORE: I believe that is a very good system. It has been adopted, with one or two slight modifications, in Nova Scotia by Mr. Fuller, Superintendent of Agricultural Societies and Fall Fairs there, and the reason for its adoption was this: Very often there would be two fields nearly alike, but one would have to get first prize, although perhaps there would not be more than a half or a quarter of a point of difference between them. Perhaps on the other hand the difference in the prize money would be anywhere from $5 to $10. Mr. Fuller considered—and I think rightly so—that that was unjust.

It has fallen to my lot every year to start the judges and I have noticed that it depends altogether on the judges themselves as to whether or not one day's instruction is sufficient. Of course, we do not have so large a number of judges in the East as you have in the province of Ontario.

MR. CLARK: I want to express satisfaction at the importance placed on what I consider the main value of field crop competitions viz., the demonstration which the farmer has provided for himself and his neighbours, from which demonstration he has learned the principal defects in his crops and can correct them. The educational effect of the field crop competitions is something that I have always looked to as being most valuable.

Next to that we now have what we did not have when the field crop competitions were first started, in almost every district in Canada where agriculture is of importance, a really good supply of seed grain that is usually distributed within the locality. My experience has been that in nearly all instances the seed that is being grown by competitors in the field crop competitions traces back ultimately to plant breeders who are working at one or other of the experiment stations, either federal or provincial. The work that is being done by Professor Zavitz, Dr. Charles Saunders, Professor Klinck and a great many other men engaged in plant breeding is not fully recognized,—is not clearly understood by the farmers themselves who are growing the seed.

The members of the Canadian Seed Growers' Association are perhaps the principal sources of supply for high class seed that is now available in quantity to farmers who are competing in the field crop competitions. If it were not for the fact that the field crop competitions in all the Provinces are now in a thrifty condition, the members of the Canadian Seed Growers' Association would not find quite such a good market for their supplies. I am very glad to be able to say that the amount of money our Federal Department of Agriculture supplied during each of the last two years, namely $30,000 per year, will be increased fifty, or a little more than fifty per cent for the future. The Honourable Martin Burrell has communicated with each of the Provincial Ministers of Agriculture with a view to increasing the extent of the appropriations and to leaving to the provinces a little more latitude in the regulations governing field crop competitions.

It has been a source of great encouragement to me to hear Mr. Wilson mention in particular the value of the educational work and to note in the discussion that men who are closely associated with this work recognize the splendid results that have been accomplished.

MR. GOURLAY: I would like to ask Mr. Raynor what kind of fanning-mill the would recommend.

MR. RAYNOR: It would not be judicious to advocate any one make of fanning-mill in preference to another. The main point is to get a good one, and then to get some one who knows how to work it. If the farmers in a locality were to establish a power-mill superintended by a capable man and would bring their seed grain there to be cleaned it would, I think, solve the problem to a very large extent. There are mills that perhaps are a little better than others. One of the best mills for small seeds is an American one called the "Clipper". For large seeds another mill which is doing very well, but which is a little slow, is the "Perfection", lately sent out by the T. Eaton Company. The "Chatham" mill is also a good mill. Another very good mill is manufactured at Almonte but I do not think it is very good for cleaning grass and clover seeds. The principal thing is to have the right kind of sieves and to adjust them properly.

MR. BRADLEY: At Winchester, a power-mill for cleaning grain is operated by a man who charges so much per bushel. He will grade it any way you desire, will grind the grain he has taken out and charge for it, or you can take it home with you if you prefer. I think this is a very good idea and one which might be put into practice if the farmers would co-operate in the way suggested by Mr. Raynor.

I do not know of anything doing better work in the province of Ontario than are the standing field crop competitions. As was said last night by Prof. McCready, "get the boy or girl started in the work and he will educate himself". Get the farmer started in procuring better seed grain and he will continue to do so. In my experience in judging in the standing field crop competitions throughout the province for the past four or five years, I find that the majority of the farmers are very indifferent about their field of grain. They simply tell the little boy or girl to show the judge where the field of grain is and then go on about their work and pay no more attention to him than if he were a book agent. Other farmers are very inquisitive and the judges as a rule do not spend enough time with such men. When I find a farmer who is anxious to find out about anything I stay a certain time and give him whatever information I can. Sometimes I get a good deal of information myself. Most of the judges, I think, are in too big a hurry to get home to look after their own interests.

MR. WILSON: In sending out registered seed I think it should be sent out as Mr. Hodson would send out his pedigreed cattle—as I would have sent out my Ayrshire cattle in the old days. What did "pure-bred" mean? It meant no mixture of any other strain in them. If there were a cross of Durham or Holstein in them they would not be desirable. Three years ago a quantity of Registered Banner oats was purchased by a number of Agricultural Societies in this province. This seed, according to official analysis, contained four kernels of barley per pound of oats. Although advised of this fact by Mr. Newman these societies decided to risk buying the seed, with the result that there was any quantity of barley in the crops produced. As most of these fields were entered in the field crop competitions they were knocked endways. I merely mention this incident to emphasize the necessity of sending out absolutely pure seed.

THE PRESIDENT: I would be glad if Mr. Wilson would sum up the discussion and while Mr. Wilson is thinking for a moment I would like to express my approval of one practice that is not quite common in these field crop competitions —the practice which has been followed by the Canadian Seed Growers' Association of leaving with the grower a record of the score used in judging. I value that practice and when we sent out the collectors for the Committee on Lands of the Commission on Conservation the schedules were framed to be educative records left with the farmer. If a record is left with the farmer himself of what the collector or judge found, he will examine it from time to time. It is likely to mark the beginning of a new habit of thinking with the man. He will say "I never thought of that before; I didn't think of this comparison; I never observed these things so as to think of them carefully." Doubtless he is not so indifferent or ignorant regarding the conditions of the field crop competition, but I think it would be highly useful for each competitor to have a carbon copy of the judge's record of his crop.

Another point strikes me, and I mention it with all diffidence, because in it I seem to be running counter to other opinions that have been expressed. I think we are going too far in directing and encouraging the farmer to have some other man do something for him because that other man can do it better. I refer particularly to cleaning the seed grain. I have found this in many things: that a man may do a thing better for me than I could do it for myself, but on the other hand I am a better man afterwards for carrying on the whole enterprise if I attend to the several parts of it myself. If the farmer can take his grain to some other place and bring it back improved, I wonder whether he is not going to lose in detail and exact knowledge and ability for the care of the field next year more than he will gain by the quicker and, to him, simpler way of having his seed grain cleaned by another.

MR. WILSON: I am glad to know that the work in this province, and in other provinces is progressing, and I hope that among us all in getting pointers from each other, we shall be able to further this work and make it a still greater success.

Soil Management in Relation to Yield and Quality in Seed.

(By L. S. Klinck, Professor of Cereal Husbandry, Macdonald College, P.Q.)

To compress within the brief compass of a paper, not to exceed forty minutes, the essentials in successful soil management in relation to yield and qualtity in seed is a task too difficult for accomplishment. I shall, therefore, confine myself largely to principles, although I am well aware that a brief statement of principles is very apt to be misleading unless broadly interpreted; but I am also aware that an attempt to treat at length the modifications which, in practice, confront the farmer in the management of land, would be equally open to objection because necessarily incomplete.

Soil management is not an exact science. Important as are principles, the prime factor in the entire situation is the farmer himself. He must be a man who has an intelligent knowledge of his soil, born of a first-hand working acquaintance with it. He must be a man who studies the likes and dislikes of his crops. In soil management the necessity of exercising fine judgment in many points, which are all too frequently regarded as of minor importance, must never be forgotten. Here, as elsewhere, applied knowledge of details counts.

Soils and crops are inseparable. Crop yields are determined by the amount and availability of the plant food in the soil, and by textural and moisture conditions, as much as they are influenced by the character and quality of the seed sown. The factors influencing yield, while not always completely under the control of man, are fairly well known, and appreciated; the factors influencing quality have been less studied and are, therefore, less perfectly understood.

The necessity for a better working knowledge of the principles underlying the successful management of our prevailing soil types, in relation to such fundamental points as drainage, tillage, manuring, rotation and cropping is evident; but the equally pressing need for more definite information relating to those factors which influence quality has as yet attracted comparatively little attention.

The character of the soil to be tilled, and the kind of crop to be grown, determines, in large measure, what constitutes good soil management. A knowledge of the excellencies and of the defects of the soils to be managed is basal. For example, let us take two common soil types and see how the application of these general principles works out in practice.

CHARACTERISTICS OF SANDY SOIL.

A sandy soil absorbs and retains heat well, allows water to percolate through it freely, offers but slight resistance to the circulation of air and naturally dries off more quickly and warms up more readily than clay. Owing to the coarse nature of the particles, and the absence of any binding constituent, sandy lands never puddle or bake. Moreover, frost does not exert the same pulverizing action on sand that it does on clay, and as such soils can be ploughed early without injuring their mechanical condition, fall ploughing, with them, is not as important as it is with clay lands.

For sandy soils, shallow cultivation is best. As the principal defect with such soils is their extreme openness, the system of tillage adopted should be such as to compact, rather than to increase, the space between the soil particles. Manures, when applied, should be fairly well decomposed in order to have the consolidating or binding effect of the humus. Frequent light applications of fertilizers will prove more profitable than heavy infrequent ones.

Clay soils, on the other hand, call for very different treatment. Naturally fine in texture, extremely tenacious, easily puddled when wet and readily baked and cracked when dry, these soils, unless drained, are cold and wet in the spring. Unless exposed to the disintegrating action of frost, made possible by ploughing in the fall, such soils are apt to be in such poor mechanical condition as to necessitate a great amount of labour in getting them into sufficiently good tilth to make a fine seed bed. In such soils the danger of loss of plant food by leaching is reduced to a minimum; water is held tenaciously and its movement in any direction is slow. Their greatest defect—extreme heaviness—may be overcome by thorough under draining, deep tillage and the incorporation of vegetable matter in the form of fresh strawy manure or by turning under a green manure crop, as rye, buckwheat, or clover.

DRAINAGE.

Wherever needed, thorough drainage is essential to good soil management. Underdraining, while more expensive than surface draining, is unquestionably, wherever practicable, the more effective and satisfactory method. Underdraining lengthens the season for profitable tillage; results in better textural soil conditions at a minimum expense for fitting; ensures larger returns to the acre of more evenly matured and consequently better quality crops; admits of the successful growing of a wider range of crops than would otherwise be possible, and so contributes to the holding of weeds in check and to the improvement of the physical condition of the soil.

TILLAGE.

Ploughing is the basic operation of all cultivation. Of all tillage operations it is the slowest and most expensive. and of all cultural operations it is probably the least understood. As a result, ploughing is all too frequently poorly done, and in many cases careful ploughings have given way to mere surface scratchings.

The increased cost of farm labour, and the greater efficiency of the implements used in surface tillage, have contributed in no small measure to the prevalent idea that time spent in good ploughing is not profitably employed. On some soils, it must be admitted, we have learned to get along with fewer ploughings than was formerly thought economical, without sacrificing efficiency, but this, in itself, constitutes one of the strongest reasons why ploughing should be well and intelligently performed whenever it is done.

Good ploughing is no less essential to-day than it ever was. True, the practice of setting a toppy comb on a furrow is no longer regarded as the crowning test of good ploughing. That standard was rightly abandoned long ago. To-day a clear distinction is made between fancy ploughing and good ploughing; and in the near future, when we have come to appreciate better the cultural requirements of different soils, our ideas as to what constitutes good ploughing will undergo further changes.

Thorough surface cultivation will never displace or stand out pre-eminently over good ploughing so long as the eradication of weeds and the economical preparation of a good seed bed are prime considerations in cultural methods.

The time and manner of ploughing should be governed by soil conditions and by the objects sought. Good ploughing in the fall may not be good ploughing in the spring, even in the same field. For example, flat-furrow ploughing is best adapted for accomplishing the rapid decomposition of sod in summer; but if the sod field cannot be broken up at this time, a very different type of furrow will be called for when the field is ploughed in the fall. Then, instead of the shallow flat-furrow, the deeper lap-furrow will prove more effective. Within limits, the heavier the land, and the more it stands in need of underdraining, the more pronounced should the lap be. If the sod land, however, cannot be ploughed during the summer or fall, it may be broken up in the spring. In this event it should be ploughed at a less depth, and with a wider furrow, than would be best for fall ploughing. Moreover, in spring ploughing the aim should be to do the greater part of the rough pulverizing by means of the plough. A bold, overhanging mouldboard will effect the desired result most economically and will reduce to a minimum the cost of fitting the land by surface cultivation.

It will be seen, therefore, that at least three distinct kinds of furrows can advantageously be employed in the same field, depending upon the work to be done. Shallow, flat-furrows answer best for July and August ploughing; narrower, deeper, unpulverized lap-furrows should be used in fall ploughing, while the comparatively wide, shallow, pulverized furrow-slice will give best results in the spring.

The time to begin the preparation of land for field crops is the preceding fall. With but few exceptions, fall ploughing has proved better practice than spring ploughing. Fall ploughing induces the germination of volunteer grain, prevents the seeding of weeds, holds injurious insects in check, equalizes farm labour, makes conditions favourable for the absorption and retention of rainfall and snowfall, facilitates the pulverizing action of frost and enables the land to be seeded much earlier in spring.

In sowing grain on land which has been planted with corn the preceding year, and on which the corn roots have been turned under, considerable surface cultivation is generally necessary. When this condition obtains, the great essential is to compact the soil rendered too loose and open by the presence of corn stubbles. The roller serves a useful purpose under these conditions, but as its compacting influence is apt to be confined to the upper few inches of soil, it should be preceded by the disk cultivator set to act as a sub-surface packer. On such lands, unless the soil is compacted, there is a too free circulation of air, which dries out the soil more rapidly than moisture can be brought up by capillarity, with the result that the crop, and especially young clover, is apt to dry out and burn up during hot, dry weather. In such cases, and they are by no means rare, the failure to get, and to maintain, a satisfactory stand of grass and clover seeds is directly attributable to a lack of sufficient soil moisture, which might have been conserved by intelligent preparation of the seed bed.

Failure to secure good crops, and especially the inability to maintain a satisfactory stand of grass and clover seeds, is all too frequently attributed to a lack of fertility, whereas the fact is, the supply of moisture is inedaquate, and hence, in such cases, moisture, not fertility, becomes the limiting factor in crop production.

The ancients tilled the soil primarily for the controlling of noxious weeds; the farmers of mediaeval times laid great emphasis, in their tillage operations, on fining the soil so that the plants could feed on the small particles of earth directly; the farmer of to-day has learned to till for tillage sake. He knows tillage is not manure in the sense in which Tull understood it, but he appreciates its restraining influence on weed growth, he knows it is a potent agency in rendering plant food available, in improving the physical condition of soil and in conserving moisture adequate to meet the requirements of abundant crops.

ROTATION AND CROPPING.

How to produce larger crops and increase the net profit per acre, without depleting the soil of its fertility, is a pressing problem. Rotation of crops is generally regarded as the most effective method of accomplishing the desired result. In planning a rotation, however, certain important principles must be borne in mind. In general practice, a rotation should furnish a money crop, a hoed or cleaning crop, a live stock crop and a legume crop. A knowledge of crops is as essential as a knowledge of soils, because crops differ in the length and disposition of their root systems, in their time of feeding, in their power of assimilation and foraging, in their effect on the texture of the soil and in the amount and value of their residues.

Again, all crops exhaust the fertility of the soil; but all do not deplete the fertility uniformly. Most crops extract much and return little or nothing; others add one element and draw up other elements from lower depths, which they leave near the surface.

All cereals are soil-exhausters. All legumes are soil enrichers, at least in the most expensive element of plant food in which our soils are apt to be deficient, namely, nitrogen. Over two thousand years of recorded observation goes to show that cereals produce larger crops when they follow a legume such as peas, beans or clover. Therefore, in any permanent system of successful crop growing, the culture of clovers and closely allied species must have a place.

Whether the rotation is a three, four or five-year one, is a matter to be determined wholly by circumstances. The essential thing is that a systematic rotation be followed, that the product of the fields be consumed by live stock, and that the residue be returned to the land with a minimum of waste.

The oldest soil experiments in the United States with an authentic record and with a present continuation of the experiments originally inaugurated, are at Urbana, Illinois, and were first planned by Prof. Morrow in 1879.

Dr. C. G. Hopkins in his recent book on "Soil Fertility and Permanent Agriculture," in dealing with the corn oats-clover rotation on this land, says:

"As an average of the three years where corn has been grown every year, the yield has been 27 bushels in the 29-year experiments and 35 bushels in the 13-year experiments. The lesson of these experiments is that 12 years of cropping where corn follows corn every year reduces the yield from more than 70 bushels to 35 bushels per acre, after which the decrease is much less rapid, amounting to only 8 bushels' reduction during the next 16 years. Undoubtedly the rapid reduction during the first twelve years of continuous corn-growing is due in large part to the destruction of the more active decaying organic matter, resulting ultimately in insufficient liberation of plant food within the feeding range of the corn roots. In addition to this, the development of corn insects in soil on which their favourite crop is grown every year is sometimes an important factor in reducing the yield."

"Where corn is followed by oats in a 2-year rotation, the average yield of the three crops of corn is 46 bushels in the 29-year experiments, whereas in the 13-year experiments the average yield for the same three years is 62 bushels of corn per acre. In this case the destruction of humus is less rapid, and the development of the corn insects is discouraged by changing to oats every other year, so that the decrease in yield is less marked during the early years, although the reduction continues persistently with passing years. During the first 11 years the yield decreased from more than 70 bushels to 62 bushels, and during the next 16 years a further reduction of 16 bushels has occurred."

"With the 3-year rotation, corn is grown for one year, followed by oats with clover seeding the second year, and clover alone the third year. During the first ten years under this system the yield of corn has decreased from more than 70 bushels to 66, and during the next 16 years the yield has further decreased

to 58 bushels, the average reduction being only one-half bushel a year. In this system the most marked reduction in crop yields has not yet appeared, although it must be expected in the future because the clover crop is already beginning to fail on the oldest field, even in seasons when clover succeeds well on newer land under the same crop rotation. When clover fails, cowpeas are substituted for that year on that field, which thus provides a legume crop and preserves the 3-year rotation".

At Macdonald College, where oats have followed oats for four years on well-tilled land which has not had any manure or fertilizers for 7 years, the average yield per acre has been 53·67 bushels, as compared with an average yield of 68·19 bushels per acre for the same variety on rotated land for the same period.

Where barley has followed barley under the same conditions, there has been an average yield of 29·29 bushels in favour of the rotated plots. It is only fair to state, however, that the rotated land has been sufficiently heavily fertilized to enable it to produce good crops without incurring risk from loss through lodging.

Certain of the plots at Ste. Anne have grown alfalfa continuously for 8 years. These plots have not had any manure for 22 years and no one has been found who knows when manure was last applied. Compared with the manured plots beside them, the spring seeded one shows a yield of 4·35 tons of hay, as compared with 5·02 tons; while the fall seeded one averaged 3·46 tons as compared with 4·98 tons on the manured plot. In both cases the unmanured plots showed a higher percentage of cured hay, the spring sown one being one per cent higher and the fall sown one practically five per cent higher.

DATES OF SEEDING.

Few, if any, cultural experiments in this country have thrown as much light upon this phase of the subject as has the experiment, conducted at several stations, and known as dates-of-seeding experiment. Briefly summarizing the results with regard to yield, we see that with all classes of small grains, with the exception of peas, the largest average yield has been obtained from the seeding put in just as early as the land could be worked to advantage. Later seedings, with but few exceptions, showed a marked falling off in yield of grain as well as a pronounced deterioration in the quality of the resulting crop.

Among the many factors contributing to the lessened yield in the later seedings, the following are deserving of mention: Poor textural condition of seed bed; lack of sufficient soil moisture to ensure uniform germination and evenness of tillering; imperfect development of kernels due to the effects of intense heat at the time of filling; lack of uniformity in maturing and injury from the attacks of rust.

RATE OF SEEDING.

The rate of seeding also directly influences yield and quality in practically all field crops. Usually the yield is affected more adversely than the quality. With non-tillering varieties, heavy seedings tend to greater uniformity of product and higher yield than lighter seedings, providing soil moisture requirements are met; but heavy seedings with stooling varieties materially lower the yield and quality of the crop. If the rate of seeding is too heavy, the crop will give unmistakable evidence of it in the lack of tillering, fineness and shortness of straw, tendency to lodge, susceptibility to rust, abnormal earliness of ripening, low yield and lack of scale in the size of the resulting grains.

Moisture, not fertility, is usually the determining factor governing the rate of seeding, whether the grains are seeded in a district of ample rainfall or whether they are sown in a semi-arid country.

GRAINS SOWN SINGLY AND IN COMBINATION.

A pronounced increase in yield, and a still more decided improvement in quality, is secured when grains, which mature at the same time, are mixed and sown in proper proportions. This is especially true in the case of wheat.

DRILLING AND BROADCASTING.

Drilling, while generally to be commended, is especially advisable where moisture is the limiting factor. Where this condition obtains, double disc drills are to be preferred to other types, because they bring the seed in closer contact with moist soil. This results in a more prompt and even germination, which not infrequently determines whether the crop will have time to mature or not. Press drilling, preceded and followed by the packer, frequently results in a profitable crop; whereas broadcasting, or poor drilling, with or without the judicious use of the packer, would result only in failure. What has been said with regard to the drill is equally true with regard to the summer-fallow and stubble land for wheat. In fact, the successful growing of any adapted grain crop in the drier parts of our Canadian West, is dependent, in large measure, upon the ability of the farmer so to manage his soil as to retain a sufficient amount of moisture for the proper development of his crops. Indeed, his methods of ploughing, cultivating, packing, seeding and after-harvest discing are all governed by this one consideration—the conservation of moisture—in sufficient, but not too great, quantities for maximum production, consistent with early maturity.

Cultivation of small grains to induce tillering, as well as to form a mulch, influences yield and quality. This is especially marked in the matter of uniformity of ripening and the preventing of a second growth when, for any reason, ripening has been unduly hastened.

In our improvement work at Macdonald College with grasses, clovers and alfalfas, as well as with cereals, the influence of drilling, as compared with broadcasting, is very pronounced. For example, many timothies will produce two crops of hay in a season when sown in rows and kept thoroughly cultivated. Common red clover, a biennial, when sown as late as the second week in June, will, under these conditions, sometimes mature seed perfectly within less than four months from the date of seeding. Alfalfa, when sown in rows and kept thoroughly intertilled, will give one, and sometimes two, crops more during the season than will the adjoining broadcast plots. Moreover, alfalfa seeded in rows and kept cultivated, will give a large yield of excellent quality seed compared with the yield of seed from broadcast plots.

CORN IN HILLS VS. DRILLS.

Whether for grain or for ensilage, planting corn in hills is to be preferred to planting in drills. This is especially true when grain is the prime consideration, as yield, and especially quality, are to be found in the hill plantings. The proper rate of planting, however, must be more carefully conformed to in corn than in small grains for, although the yield of grain per acre will increase up to five stalks per hill, the size of the ears and the quality of the grain deteriorates rapidly after there are more than four stalks per hill.

Frequent, shallow cultivations will prolong the growing season for corn and will tide the crop safely over a hot, dry period, which would otherwise check the growth of the plants and so reduce the yield. In seasons of abundant rainfall, however, cultivations should only be sufficiently frequent to hold weeds in check, otherwise too much late top-working will retard the maturity of the grain. If late cultivations are wide and deep, the first effect is to check the

growth of the crop as a result of the root pruning. In this event, if the growing season is a prolonged one, the injured plants sometimes make a second growth, and so the crop is late and uneven in maturing. The same principle holds equally true with root crops grown for seed.

ROTHAMSTED EXPERIMENTS UPON WHEAT AND BARLEY.

Undoubtedly Broadbalk is the best known experiment field in the world, and plots 2 and 3 are the most often referred to. While the continuous growing of wheat on the same land is not to be considered the best practice, the records show very clearly that it is possible. "In the case of the unmanured plot, under the continuous growth of wheat on the same land, there was", says Director Hall, "a small decline in production for the first 18 years, yet the crop has been practically constant during the last 40 years. The fluctuations during this period are, in the main, due to season, and correspond very closely with those of the completely manured plots. All evidence seems to point to the fact that this plot, which has been without manure of any description since 1839, has reached a stationary condition and will in future diminish very slowly, if at all."

"Under continuous barley growing the decline has been much more marked than on the wheat plot similarily treated, the average crop having been only 10 bushels for the past ten years, as against an average of more than 15 bushels for the whole period. The continual fall of crop from decade to decade would seem to show a progressive exhaustion of the soil, without reaching the comparatively stable condition of the continuously unmanured wheat plot. The more limited root range of the plant would bring about a complete exhaustion of the available soil much sooner with barley than with wheat. On the whole, however, the results point to the probability that unmanured land will become unable to grow barley continuously at a much earlier date than will be the case with wheat, so comparatively restricted is the range of the barley roots."

"The fundamental importance of cultivation and the suppression of weeds", continues Director Hall, "is to be seen in the returns from the continuously unmanured plot. This piece of land at the beginning of the experiments was not only in poor agricultural condition, but had been under arable cultivation for at least two or three centuries, and was therefore far removed from the condition of virgin soil with its accumulation of fertility, and yet by cultivation alone it has been able to grow for sixty years a crop averaging 13 bushels to the acre. This is almost the average crop produced in the United States, and is very similar to the general average production of the great wheat-growing areas of the world. Nor is there, as far as can be judged by the records for the last forty years, any reason to expect that this crop cannot be maintained in the future, provided that the cultivation and cleaning of the land be continued."

So much for the effect of the system of soil management on crop yields as these relate to the Rothamsted work. Let us now direct our attention to a consideration of the influence of this management on the character of the resulting crop. In this connection Director Hall says:

"The farmyard manure plot has given on the average the best grain, showing the highest weight per bushel and the highest price in commercial valuation, but there are several years in which corn from this plot occupied a very low place in the series. It is important to notice that the continuously unmanured plot, with its small yield, yet produces grains of corn which are almost up to the average in size, weight per bushel and value from the commercial point of view. The plant, when starved, diminishes the number but not the quality of the seed; even the proportion of "tail" grain is not above the average on

the plot. The proportion of corn to straw is the highest on the plot, as though starvation resulted in concentrating the highest possible proportion of material on the reproductive parts of the plant."

"On the whole it will be seen that the great differences of manuring to which the Rothamsted plots have been subject for so long a period have a much greater effect on the gross amount of crop than on the quality of the grain. Fluctuations in the amount of the crop due to season or manuring are reflected to a much smaller degree in the composition of the grain; the composition of the straw, however, shows wider variations, induced by the differences in the manure applied".

CONCLUSION.

From a consideration of the above evidence, part of which may rightly be regarded as conclusive by virtue of the number of years of careful experimental work behind it, and part of which is based upon observations and results of fewer years of work, we are justified in concluding that soil management plays an important part in influencing the yield and quality of all classes of field crops, and what may be termed "reasonably good management" influences the yield much more than it influences the quality.

Difficulties Encountered in the Propagation of Pure Seed.

(By Charles E. Saunders, Ph.D., Dominion Cerealist.)

Since the attention of members of the Canadian Seed Growers' Association has of late years been turned rather towards the propagation of seed in pure condition than to the origination of improved strains or varieties, it may be worth while for us to consider briefly some of the chief difficulties which have to be overcome if one is to obtain by propagation large quantities of seed of a very high degree of purity.

Let me say at the outset that here, as elsewhere, perfection is only an ideal, not a possibility. Yet we must not lose sight of the ideal, and if we work patiently and carefully we can come very close to the attainment of it.

The experience of many years in the propagation of pure seed has taught me that the difficulties are far more numerous than would at first be imagined, and present themselves sometimes in very curious and unexpected ways.

First of all I shall mention the animals and implements used in cultivating the fields. It is of the utmost importance that horses employed in the preparation of the land should not be fed any kind of material containing germinable seeds, as these frequently pass through the horse undigested and with their vitality unimpaired. Oats are, of course, the greatest source of trouble. These should be very carefully ground. The implements for ordinary field preparation are easy to clean and no difficulty should be encountered here, though it would be quite possible to bring on to the land from another field (embedded in earth clinging to some implement) seeds which might cause trouble.

I fear it is impossible in practice to be absolutely certain that the land itself does not contain any germinable seeds, even of the cereals which we commonly grow. It seems clear from such evidence as is available, that wheat, oats and barley may remain in the soil for a year or two without germinating, and may afterwards germinate when more favourable conditions arrive. This is especially likely to occur in dry climates. The seeds of some weeds are known to retain their vitality for years in the soil, but weeds are not a very serious problem in the propagation of pure seed grain. The greatest difficulty is with other cultivated grains, especially those which are of similar type to those we are propagating.

For a field of seed grain we should select land which has been in sod or in summer-fallow, or on which a hoed crop has been grown the previous year. In some rare cases it may be justifiable to use a field on which grain has been grown the pervious season, but this must of course be again of a totally different type, and the field must have been ploughed or cultivated very early in the autumn to induce the sprouting of the shed grain.

A word of caution is necessary in regard to pasture land. It is not at all uncommon to find wild oats growing in a freshly cultivated field of old pasture land, and there is ample proof that in some cases these wild oats are derived from oats fed (without grinding) to horses on the pasture. It is evident therefore, that if pasture land is to be used, great care must be exercised in feeding grain to the animals in the field, whenever any such extra food supply is given.

I shall not speak of the mechanical preparation of the soil, as that is scarcely within my province. It will be sufficient to remind you that it is worth while providing an extra good seed bed for specially valuable grain. It is important also to choose the most favourable time for sowing the most important fields. If anything must suffer from delay at seeding time, it should not be the field of pure grain.

I am taking it for granted that a stock of pure seed, though perhaps only a small quantity, obtained from some trustworthy source, is available to start with. In handling the seed, and especially at threshing time when handling the threshed grain, bags are a particularly common source for the introduction of impurities. The average bag has no conscience, and may retain by its coarse fibres, especially along the seams, a considerable quantity of oats or a smaller quantity of the smoother grains, such as wheat. Weed seeds are also often held in this way. It is therefore imperative that every bag into which pure seed is being put should be turned inside out and examined with extreme care before being used. There should be no exceptions to this rule, unless perhaps in the case of perfectly new bags which are known to be fresh from the factory and never to have contained any seed whatever.

The seed drill must of course be perfectly clean. Some types of drills are easy to clean, and others are difficult. If there is any doubt as to the drill being thoroughly clean, it is advisable to run it for a short distance to make sure that it is empty. This, however, should in no case take the place of a thorough examination of the machine.

Two other sources of danger may be mentioned in connection with the operation of seeding. These are especially serious when a number of different varieties are being sown on neighbouring pieces of ground. It is possible that kernels may be carried in the earth attached to the horses' feet or to parts of the drill if seeding is being done on land which is a trifle too moist and sticky. Under conditions such as prevail at the Central Experimental Farm, with the very large number of varieties which must be sown as promptly as possible after the season opens, we cannot always wait for ideal weather, or take time to prepare an ideal seed bed. The difficulties involved in sowing in somewhat sticky soil have occasionally to be met.

A high wind at the time of seeding is another source of danger, because an occasional seed may be blown several yards away from the drill, or even sometimes much farther. In ordinary farming operations this might not be serious, but on experimental stations it is a difficulty which must be reckoned with.

Surplus seed, if any is left in the seed drill, should be collected as far as possible and placed in a bag, as it is very unwise to leave any quantity of seed discharged on the ground, after a plot has been sown. We use on the Central Farm a couple of troughs made of galvanized iron, which we place under the spouts of the seed drill, and into which we are able to discharge the whole of the surplus seed.

After the seed is sown there still remains a possible source of trouble in the passage across the field of any kind of quadruped or biped who may perhaps carry an occasional seed some distance on the feet. It seems possible also that birds may under some circumstances act as carriers of seed, though this is rather doubtful.

Rain is a very common cause of serious difficulty. At Ottawa our plots are about 51 feet long and our roadways 12 feet wide. As a result of a little rivulet formed during a heavy shower the day after seeding, I have seen wheat that had been carried across a plot of barley and landed in a plot of peas, having travelled a distance of about 80 or 100 feet. But this is only a small incident compared with what has occurred on other farms, when in some cases water (or even wind) has removed about 3 inches of the surface soil and transported it for a considerable distance. I am speaking here of fairly large areas of land. Of course when any such great disaster occurs, it is a comparatively simple matter to cut out a few plots, or even an acre or two on a large field, and set it aside as probably or certainly impure, but on a small scale one might easily overlook incidents which were really very serious.

After the grain has once sprouted and taken root, there is little or no possibility of any untoward accident occurring before harvest time.

A careful inspection should be made of the growing grain at least two or three times between the commencement of heading and harvest. There may be a few foreign types or other impurities visible at one period which would not be visible at another. In my opinion it is often worth while to rogue a field of standing grain. This of course depends on circumstances. On the Experimental Farms we have sometimes carefully rogued fields as large as 10 and 20 acres. I do not say it would pay a private individual to do this in every case, but I think there are instances when it would pay well, especially when one is making an effort to obtain oats free from barley. At a certain stage the barley plants are very easily seen among the oats, and I think it would be many times cheaper to remove the barley plants from the field than to remove the barley from the oats after the crop was threshed.

If harvesting is done with a binder, it is scarcely necessary to mention the difficulty of getting this implement clean. It can, however, be done with some makes, perhaps with all. But the cleaning is a dangerous operation unless the horses are removed. A small plot should always be harvested by hand.

As a rule there is very little danger of grain being transported by running water from heavy rain-storms at harvest time, as this season is fairly dry in most parts of Canada, but there is an enormous danger from wind. Even in such a climate as that of Ottawa, where high winds are not very common, it is astonishing to find the distance to which heads of grain will travel. When the earliest varieties are cut, an occasional head may be carried into a plot of a later ripening sort, or into a stook of another variety already harvested. Large disasters from very high winds are quite common. We have had peas that were drying in the coils transported a considerable distance by a sudden high wind and mixed into one mass, beyond the possibility of separation, and this in spite of the fact that a stout stake had been driven through each coil into the ground. This incident did not occur at Ottawa, though we had a similar misfortune many years ago before commencing to use the stakes. On another occasion at Ottawa a strong wind arose when many of our barley plots were in stook, and though the stooks were well made, some of them were thrown down entirely, and a number of the sheaves were carried from 50 to 100 feet or more. It was quite impossible to correctly locate some of them afterwards, and we lost a good deal of pure seed in consequence.

Carrying the grain from the field to the threshing machine is not a matter of difficulty, except where many varieties are being grown in small lots. On

the Ottawa farm we use sheets 12 feet square, and throw the sheaves into the centre of the sheet, which is then tied by the opposite corners. One of these bundles can be handled by two or three men, and we are able to place several of them at a time on a flat wagon.

The threshing machine is the greatest enemy of pure seed. The tales that are told about the contents of threshing machines, which have been opened up sufficiently to reveal their inward secrets, are almost beyond belief. It is a conservative statement to say that under ordinary conditions grain which has passed through a threshing machine must be regarded as of doubtful purity, no matter what its previous condition. Experiment stations are of course equipped with special threshing machines which are capable of being more or less accurately cleaned out. At Ottawa we spend more time, I think, in cleaning than in threshing, but I believe that the two machines which we use are cleaned practically to perfection after each operation. A farmer who is obliged to thresh with an ordinary large machine, should have it cleaned out to whatever degree he can. This will vary with the character of the machine and the spirit of the men operating it. As a further precaution he should alternate the types of grain as radically as possible. For instance, if one had to thresh two lots of oats and one each of barley, wheat, peas and timothy, an arrangement such as the following would be very good: to commence with oats, provided that was not the type of grain which the previous user of the machine had threshed at the close of his operations. Oats could be very well followed by peas, and these by barley, timothy, wheat, and finally the second lot of oats. Such an arrangement would be very much better than to thresh the two varieties of oats one after the other, or even to have them separated only by the peas. One must consider what types of grain are the most difficult to separate in the subsequent cleaning of the threshed grain. The separation of oats from oats being practically impossible, these two should be kept as far apart in the threshing operations as possible. The separation of oats from barley being extremely difficult, these two should be threshed quite far apart. When working with an ordinary machine it is of course absolutely essential to reject for seed purposes several bags of the grain that come through at first, unless one is quite certain that the residual impurities, coming out of the threshing machine, can be separated in the fanning mill. The importance of clean bags at threshing time has already been pointed out. I have known a farmer to suffer great inconvenience because he had not prepared quite enough bags himself and allowed some workman to bring up a few additional bags when the threshing of his oats was nearly done. The oats, put into these extra bags, were afterwards found to contain wheat, and it became necessary therefore to clean the whole lot through a special machine, though the actual quantity of wheat present was extremely small.

The last operation of all which we have to consider is the cleaning and grading of the seed grain in the fanning-mill. Most fanning-mills can be thoroughly cleaned out, provided the necessary patience and time are devoted to the operation. There is no excuse for the mixing of varieties or types in the fanning-mill. I am very sorry to say that a rather extended familiarity with fanning-mills has bred in my mind an unmixed contempt for them. With the exception of one decrepit, old machine, of a type now no longer manufactured, which is threatening to fall to pieces in spite of repairs, I have yet to see a fanning-mill with anything like an adequate wind supply. Even the old relic referred to, which has been in use on the Ottawa farm for twenty years or more, is deficient in this respect. All the fanning-mills I have ever seen are made on wrong principles, and with faulty details of construction as well. A good fanning-mill for the cleaning of seed grain is one of the greatest needs in the way of implements for farmers at the present day.

Other types of grain cleaning machines are also being studied at Ottawa and from time to time purchases are made. I am in hopes that we shall ultimately be equipped with machinery which will accomplish the cleaning thoroughly and thus avoid the enormous amount of hand picking which is now necessary. To this end it may be necessary to design our own machines. Such fanning-mills as are obtainable are satisfactory if one desires merely to somewhat improve the character of the seed, but if one wishes to thoroughly remove light grain and weed seeds (especially wild buckwheat and vetches) and to eliminate also foreign grains, such as oats from wheat, or barley from oats, the average fanning-mill is a marvel of inefficiency.

When it is thought that the seed is as clean as it can be made by the fanning-mill, it should be carefully inspected. It is often astonishing, after a casual inspection of a sample of seed, to find the quantity of impurities in a pound when that amount is thoroughly picked over. It is certainly advisable for the farmer to personally hand pick at least a couple of pounds of any grain intended for seed purposes. He can then see whether the standard of purity which he desires has been reached. If not, further cleaning by machinery may be required or if the total quantity of grain on hand is small and if its purity is of the utmost importance, hand picking may be resorted to. This is a troublesome and expensive operation; but it is much more feared than it should be. It will often pay very well, besides giving a farmer a wholesome respect for pure seed which he can scarcely acquire in any other way.

I trust that this brief presentation of some of the difficulties and the methods of overcoming them may be of use to those interested in the production of pure seed.

MR. RAYNOR: The farmer's idea of clean seed and the expert's idea of clean seed do not always coincide. The other day I was looking over a sample of seed wheat in a seed dealer's establishment. The sample, which was sent in by a farmer, was fairly clean, but when we examined the lot, we found 42 kernels of wheat, 10 of oats, 6 of wild tares and one of purple cockle in 1 pound.

Regarding the use of power-mills for cleaning and grading seed, I think that these will have to be used in connection with centres. Men are not going to spend time enough with a hand-mill to get all impurities out. I heard Mr. Fixter say he could get wild tares out of wheat and barley by using a round sieve and not sending the grain over too fast, but letting them run through slowly while the grain went over the tail run. If a man were in charge of the mill who knew something about the proper adjustment of the sieves, and the motion, it would help to solve this problem of cleaning seed properly. Concerning the seeds flying up on end in going through the tail run, I think this can be overcome by laying a blanket on top of the sieve, over the grain. This will hold it down pretty well unless there comes enough wind to lift the blanket. Such a blanket is used in connection with the "Perfection" mill. None of these mills, however, are quite perfect in making proper separations of seed grain. The best place to remove many impurities is in the field, and we advise members of the Canadian Seed Growers' Association to have a man go ahead of the binder and pick out all impurities which appear within the width of the swath. This method is particularly effective where there is an odd head of barley, for example, in a field of oats.

Judging from the grain shown at the average exhibition, there certainly is great reason for all these precautions being taken, and it might be a good thing to advise all members of the Canadian Seed Growers' Association to have the oats crushed which they feed to horses, as no doubt a good deal of seed from the droppings of horses fed on whole grain will grow.

PROFESSOR ZAVITZ: Professor Klinck said that in Indiana, after they had had the three-year rotation for a number of years, clover did not do very well. Sometimes in the province of Ontario, especially in the south central part, along

the lake, farmers say they cannot get as good a catch of clover as they could some years ago. My impression is that the reason for that was that in cropping quite heavily, a great deal of humus went out of the soil. Possibly that would be the cause of the difficulty in Indiana, rather than clover sickness as spoken of sometimes in the Old Country. In some places in England, I believe, they are unable to sow clover oftener than once every eight years. When in Germany some years ago, they told me that they thought the cause of clover sickness was due to a fungous disease which attacked the clover just at the time of germination of the seed; that if they germinated the seed before sowing, they would not have clover sickness.

A few years ago we had a gentlemen from Ohio at our Experimental Union who made the statement that he had grown clover in a three-year rotation for twenty years. Eight years later I visited his farm, and noticed that on the fields on which he had had the three-year rotation for about twenty-eight years, he had a good stand of clover. There were a few weak places, but these were not noticeable, and the clover on that land was superior to clovers on other land which had been broken up only about seven or eight years before that.

DR. MALTE: As regards Professor Zavitz' statement that lack of humus might be responsible for the failure of clover, I might say that in my opinion every case must be considered separately, because I think that what causes clover sickness in one place does do so in another. It may be that clover sickness is caused by lack of something essential in the soil. It may be, as Professor Zavitz intimated, the presence of a fungous disease in the soil, as was suggested by the German station. I might mention that in Scandinavia, especially in Southern Sweden, where clover sickness occurs now and then, it has actually been proven that it is often caused by animal parasites—by so-called clover-eels—and it may be we have pests of that kind in Canada too. I think that question should be investigated thoroughly.

PROFESSOR KLINCK: The conclusion reached by the authorities at Urbana with regard to clover sickness is not that it is the clover sickness to which Professor Zavitz referred, in Europe, but that the failure to get a catch of clover is very largely due to the very rapid decomposition of the vegetable matter in the soil, due to the system of rotation, or lack of rotation, practised.

THE PRESIDENT: I remember seeing the work in the laboratory at Rothamsted, where they had, over a very wide field of investigation, discovered that clover sickness was caused by those animal organisms, that is, bacterial forms of life that infested the soil and prevented growth. Whenever they sterilized the soil and destroyed those particular bacteria, the sickness disappeared. When they inoculated soil with those protozoan forms of life again, the clover sickness at once reappeared.

PROFESSOR ZAVITZ: I would like to emphasize some things brought out by Dr. Saunders. Some of you may think that Dr. Saunders found a great many difficulties in getting pure seed. As time goes on, we will realize more and more what he brought out this afternoon, and the more we are connected with the Canadian Seed Growers' Association or the raising of pure seed, the more we will get down to thorough work in getting the purest seed we can.

We recently got in quite a quantity of the best alfalfa seed we could find in the West. After getting that *comparatively* pure seed, we put it through a brine made of salt and water. We find that is one of the best means of getting out some of the weed seeds. We can get out nearly all of the Ragweed seed, the hulled buckwheat and a number of other seeds in this way. There is not one single package of seed grain of all we have sent out within the last twenty

years that has not been actually hand-picked. This means a lot of work, but we feel we are not safe in sending out seed without this care being taken. I believe there is nothing which is of greater educational advantage to the boy than is the hand-picking of seed. While he may say, "There is a pretty fine lot of seed with probably not a weed seed in it", yet when he picks over that seed, he will find a little something here, and a little something there, although it seemed to be pure seed. This is an object lesson he will never forget. I wish more of the members of the Canadian Seed Growers' Association had that sort of training. If you could take a sample and examine it thoroughly and pick it over carefully, it would be one of the greatest object lessons you could possibly have. Even though it may be a little irksome, it has its influence, and I believe it lasts through life.

Potato Diseases and the Position of the Canadian Seed Growers' Association.

(H. T. Güssow, Dominion Botanist and Plant Pathologist, Experimental Farm, Ottawa.).

The members of the Canadian Seed Growers' Association, particularly those who grow potatoes for exporting to the United States, are aware, no doubt, much to their discomfort and annoyance, of the embargo placed upon the Canadian potato by the United States.

The reasons advanced by the United States authorities are clearly set forth in their potato embargo orders which place certain restrictions on the importation of potatoes from countries where Powdery Scab, Potato Wart (Potato Canker) and other malignant potato diseases exist. As far as Canada is concerned the order affects her only in so far as the presence of Powdery Scab is concerned. Potato Canker, by far the more serious malady, does not exist at the present moment in Canada.

The Powdery Scab, in our opinion, is not a really destructive disease; it merely affects the skin of the potato in a somewhat similar way as the Common Scab does, but whether the disease is malignant or not need not be discussed here; the fact remains that it has been made the pretence for excluding the Canadian potato from the American market.

A disease of any kind is undesirable in any plant, and especially so if it is propagated by means of the "seed"—in this case the seed potato—from which the new crop is raised. Powdery Scab is primarily conveyed by the use of seed of infected potatoes. Unfortunately the disease has two points in its disfavour. First, it appears that the treatment of affected tubers does not control the disease and, secondly, the fungus, causing it, contaminates the soil, which if used again for potatoes after the regular period of rotation, is liable to communicate the disease to a new crop of potatoes, though the seed used for such might be clean and sound.

These facts, unfortunate as they appear, point clearly in what direction practice should follow in order to prevent the disease. There are also two reasons for practising every precaution; first, the disease, not yet being distributed over the whole Dominion should be prevented from spreading beyond its present area of infection—within which area it has got to be controlled—and secondly, freedom from Powdery Scab will open the closed doors of trade with the United States.

Much has been said already to the members of this Association about the use of perfect seed; indeed the whole organization is based upon the principle that only the best available seed should be used. Perfect seed is not only seed which is true to name and variety and free from weaknesses of all kinds,

but most of all it must be free from disease. Inasmuch as the seed potato is the seed of the future potato crop, the seed of the disease, carried by the affected potato that is to be planted, is the seed of the new crop of disease. Hence it is no more logical to expect to reap a crop of potatoes from planted potato tubers than it is to expect to harvest disease if its seed has been sown.

The prevention of Powdery Scab, as well as a large number of other potato diseases and blemishes, is really a very simple problem and yet in practice it appears to be a most difficult one to solve.

Before giving my experience in support of the statement, I shall briefly refer to those diseases or blemishes of the potato which may be transmitted by the use of unsound seed tubers. There are three groups of ailment:—the first is more of the nature of a blemish than a disease, manifesting itself by a "hollow" in the centre, i.e. a brownish walled cavity in the centre of the tuber and which affects one variety more than another and is more prevalent in one season than in another, hence the probability that the tendency towards 'hollowing' in the center may be inherited. Tubers of this character should not be used for seed. Another condition is known as "second growth", those curious knobby tubers where apparently two or more tubers have "grown together" and thus form a gnarled irregularly shaped mass of tubers. This property may not be communicable by seed, yet we cannot recommend the use of such malformed tubers for this purpose. The last "blemish" of this group is by far the most serious. It is revealed, when present, by cutting the stem end of the tuber or by peeling part of it and manifests itself in dark coloured streaks. These streaks are in reality the so-called vascular bundles—the specialized part of the tuber which conducts the sap—and which are arranged in a ring just below the skin. This trouble is known as "sprain" or "internal brown streak or spot" and is, as far as our present knowledge goes, a varietal or seasonal trouble. At any rate, this is the explanation given by nearly all plant pathologists of the present time. To me, I must confess, these symptoms appear more like those of a specific disease than a physiological trouble, yet I have no evidence to offer in support of either belief. It is being carefully investigated and until we have secured more data we must caution all growers against the use for seed of such tubers. It is most desirable to make certain that the disease is not present by cutting each tuber before planting it at the stem end, where the trouble will plainly show itself.

The next two groups are true diseases, i.e. they are caused by very minute parasitic plants of fungous or bacterial nature. The first group includes diseases like "Powdery Scab", "Potato Canker," "Dry rot", "Late Blight", "Fusarium Rot" and "Bacterial Ring" disease. None of these can be controlled by seed treatment. Powdery Scab and Potato Canker and probable Dry Rot, are visible externally, the others appear plainly only when cutting the tuber. The farmer and potato grower ought to familiarize himself with these troubles, else he will involuntarily run the risk of growing a diseased crop. The other diseases conveyed by unsound seed tubers are Common Scab, Rhizoctonia and Silver Scurf. Silver Scurf is a newly observed skin disease. It produces sheeny patches on the surface of the size of a wheat grain or confluent patches spreading over a larger area. It is not deeper than the skin and has not been known to penetrate into the 'flesh' which underneath these patches is perfectly normal and white. These three diseases are minor diseases, they may be controlled by seed treatment, i.e. soaking the tubers before cutting them up for three hours in a solution of 1:2000 sol. of Perchloride of Mercury, which it must be pointed out is a very dangerous poison.

Most of these diseases have been illustrated in natural colours in the recently issued folder; "Potato Diseases transmitted by the use of Unsound Seed potatoes," prepared under my direction and issued by the Experimental Farm as "Farmer's Circular No. 4."

Brief reference has been made to the practical extermination of disease which, theoretically, may appear simple enough. Notwithstanding the widest distribution of the coloured folder on potato diseases above referred to, many farmers have not heard anything about the danger of using unsound tubers for seed. Some indeed have assured me that they did not know anything about the embargo enforced by the United States. This seems hardly credible, and yet it is unfortunately true. Due to this state of "ignorance" no doubt, these diseases are propagated from year to year and diseased tubers continue to be planted.

This lack of knowledge is the greatest difficulty to overcome and here is where the members of the Seed Growers' Association may assist the Department of Agriculture and its officers in stamping out disease. There are two ways of preventing potato diseases from being propagated: first, by planting only sound tubers and second by refusing to buy, at any price, diseased tubers. The farmer who has raised a diseased crop has done so because he was either negligent or unaware of the existing conditions. In either case he should not be allowed to sell his crop or to compete with other growers who have followed instructions and who have taken every care to produce a sound crop. Few farmers will continue to grow another diseased crop if once they fail to sell their crop.

It has been our experience in past years to receive a considerable number of diseased potato plants taken from fields and sent for examination and advice. It may be stated here that when a farmer notices that some potato plants in his field show a droop or yellowing of foliage, followed later by plain signs of disease, either by dying or refusing to grow, it is most desirable to immediately remove the plant, roots and all, and destroy it by fire, or in some cases the disease will spread to the sound plants. It is far better to sacrifice a few hills, than run the risk of giving any disease a chance to spread.

The aim of this Association is to supply "Registered" seed. Registered seed, I take it, is seed stamped with the Association's seal and guaranteed that it is safe to use—better to use than seed sold without such sign of quality—in fact the best that can be produced in Canada. There would be no need to obtain seed potatoes from any country abroad. Perhaps, if, in the past, we had never bought any seed from Europe or the United States of America, we would not have had any Powdery Scab. There is no evidence to show whether Powdery Scab, which is supposed to be a European disease, was first introduced into Canada or into Maine, which State is equally infested by it.

When we realize that pure seed and sound seed is the most essential factor for a sound crop we naturally must ask ourselves where can we obtain seed that would fulfil all the necessary and essential requirements. Up to the present the Seed Growers' Association, I understand, has not done a great deal with the potato although it is planning to do more in the future.

We have recently had an opportunity to examine many hundreds of samples of potatoes which have been sent for our opinion from all over the Dominion before being planted. These examinations have brought the urgency of a change of affairs so clearly to my notice that certain lines of action have begun to take shape in my mind. At the present moment the seed potatoes that are being used in Canada are most unsatisfactory, at least from the point of view of the plant pathologist. I could name two seedsmen, well-known firms, who put out, for use as seed, potatoes affected by Powdery Scab, and distributed it to many dozen farmers. One firm was unaware, or unacquainted with the fact, that their potatoes were diseased and had sold them before they could be advised. The other firm sent out potatoes which were also affected by Powdery Scab, and consoled one farmer, who at any rate, had been careful enough to have his sample examined before planting, that the question of Powdery Scab was "really unimportant and a little of it would not do any harm." This happened

in the Spring of 1914, after all the notoriety which the malady had received, owing to the American embargo. I contend that seed merchants should not be allowed to sell inferior or diseased potatoes. If they do not possess the requisite knowledge themselves to recognize diseases they might obtain free advice from the Experimental Farms at any time. By means of such carelessness or indifference, diseases may be disseminated wholesale throughout the country.

It was very rare to receive a sample of potatoes that I could really recommend for seed. The potato crop is one of our most valuable and necessary crops in the Dominion. In view of the above facts I therefore consider it most important for the Seed Growers' Association to do its utmost to bring about better conditions among our potato growers. There is no other crop which will repay so fully a little care and labour spent on it as will the potato.

The work that the Seed Growers' Association has to undertake is great, and it will take some years before an improvement of conditions is brought about. But they should commence at once—this autumn. Co-operation brings about improvement.

Every member of the Association should be visited by an inspector who should judge the field conditions of the crop—purity of variety, vigour, etc., by means of the usual score card. The farmer will then be informed of the probable value of his crop from the seed growers' point of view. If favourably reported upon, a further examination should be made later of the tubers which have been harvested. This examination should be made by an expert who will recognize diseases in their initial stage. This is most important and the Division of Botany at the Experimental Farm will gladly furnish a trained official who will examine the crop for disease. If the crop is satisfactory from both points of view, the grower will have the benefit of having his seed registered. To buy only such seed should be the aim of every conscientious seed merchant. If they would insist upon such seed, you may calculate yourself the great advantage from such a practice.

This first generation should not, however, be sold for seed in the market but by means of the Association's organization these should be given to a number of farmers who are able to furnish evidence that they will propagate these potatoes on land that has not at any time previous produced a diseased crop of potatoes. Here again the same procedure, i.e., field and tuber inspection, ought to take place and if found satisfactory, the farmer may place them on sale in sealed bags. The seed merchant and seed potato dealers should step in and make it their duty to buy only such seed and no other. Seed merchants who continue to supply low grade seed potatoes should be severely dealt with, and they will only have themselves to blame if they suffer the penalty of any action which is contrary to laws which the Government may be advised to enact against the sale of potatoes which are unfit for seed.

One of the next steps in the inspection of seed potatoes will be the thorough inspection of the stock offered for sale by seed merchants. They should be required to inform the Department of the arrival of every new consignment of seed potatoes and will only be permitted to dispose of their stock if the potatoes are really deserving the price of seed potatoes. In finding such consignment to be provided with the seal of the Seed Growers' Association, there need be no inspection or dispute. I would recommend this proposal to the consideration of the Seed Growers' Association and would urge this organization to take the necessary steps to have them carried out. I am confident that every measure suggested by practical men, that would tend to improve the quality of agricultural seed, would meet with the sympathy and support of the head of the Agricultural Department,—the Minister of Agriculture.

The next point for consideration after the provision of "ideal seed" for planting concerns the grower. We have ascertained that some potato diseases, particularly Powdery Scab (and a number of others) may live in the soil for

years. Hence, if good sound tubers are being planted on land that had once produced a diseased crop, the experience will be that the crop will again turn out diseased. No official of any Government department, no inspector of any Seed Growers' Association will succeed in controlling a disease, if the farmer or grower does not himself do his share also. Therefore make it a rule to plant only sound potatoes on land that has not produced previously a diseased crop of potatoes. This is the whole secret of success.

Remember the words of famous Lord Nelson about "Duty." The Canadian consumer has a right to expect every farmer to do his duty. If he does not—shall we ever succeed in shipping our potatoes out into the world? Follow closely the instructions in this paper and in the publications of the Experimental Farms and we shall see that the temporary embargo placed upon Canadian potatoes will have proved of real benefit in bringing about the conditions in our potato growing industry that are so desirable and necessary.

In conclusion I may say that if the export trade of Canada is to be re-established and to prosper, it will only be when we have to offer sound potatoes for export, of which no country need be afraid. Registered seed bearing the seal of the Association will be acceptable anywhere and if care be taken, in a few years there will be no seed not fit for registration. The inspectors examining potatoes for freedom from diseases will again scour the country this Fall and will firmly reject all potatoes not passing muster. Much work has already been done this year and we hope that conditions will be greatly improved this autumn, but success will depend upon the future co-operation of the Association, the seed merchant and the grower. When the present embargo went into force there was considerable agitation and the blame was put upon persons whose duty it is merely to advise farmers in disease questions. This has been done more widely in this country than in any other country in the world, but there is only one class of men to stamp out disease and that is those who plant sound seed. Remember: If you plant disease you will harvest disease—as you sow, so shall you reap.

The Seed Centre as a Basis of supply of "Registered Seed."

(By W. D. Jackson, Carp, Ont.)

Crop improvement in Canada during the last ten or fifteen years has been almost marvellous, and yet we are only on the brink of the possibilities along this line. Great results have been obtained from seed selection and the introduction of new varieties by which the yields of our crops have been greatly increased, yet from these improvements the farmer has not received the returns that are possible. The farmer is too often the victim of the agent who sells new varieties of grain in small quantities, with the result that a great many varieties of a given crop are being grown without due consideration to the market requirements or to the suitability of any of these varieties to certain localities. The aim of the "Seed Centre" is to overcome this condition of affairs.

The lack of consideration of the demands of the market and of varieties best suited for certain districts is probably most clearly shown in the case of potatoes. Enquiries show that over fifty varieties of potatoes are grown in Ontario each year. With so many varieties it is almost impossible for the farmer to get anything but a local market for his crop. It is possible therefore for foreign countries and other provinces, where varieties of the same type are grown, to ship into Ontario potatoes which command a higher price than do home-grown potatoes. The same condition applies to most other crops, many farmers in the same locality continuing to grow many different varieties without any consideration of the market demands.

Realizing that over forty million bushels of seed are required annually in Canada, and realizing the growing demand for improved and even Registered Seed, we are confronted with the question of how this demand for Registered and improved seed is to be supplied. The organization of seed centres seems to offer a solution.

The rapidly increasing demand for Registered Seed demonstrates that seedsmen and farmers are realizing the value of the important work carried on by the Canadian Seed Growers' Association. The active members of the Association are so scattered that it is impossible to procure any great quantity of a given variety of grain in any one district. Owing to the manner in which men producing "Registered" seed are scattered, the cost of this seed is almost prohibitive, owing to freight rates. In order to overcome these conditions a number of seed centres were organized throughout Ontario during the Spring of 1913. The first Seed Centres to be organized were at North Gower and Kinburn in Carleton County. Mr. Newman, Secretary of the C.S.G.A. and originator of the scheme, and the writer conducted the organization meetings of these centres Mr. Newman outlining the work of the C.S.G.A. and explaining the objects of the Seed Centre.

The Seed Centres were organized with the object of having all members take up the work as outlined by the C.S.G.A. The crop decided upon for both of these Centres was "Oats" of the Banner variety, on account of this variety being most extensively grown and being particularly well adapted to the districts where the centres were established. The seed supplied to the members of these two centres was first generation Registered Banner oats purchased from a member of the C.S.G.A. in Manitoba. The plots were inspected during the summer by Mr. Main, Assistant Representative of the Department of Agriculture at Carp, in conformity with the regulations of the C.S.G.A.

The Seed Centre forms an excellent means for encouraging the growing of Registered Seed of a given variety in large quantities in certain districts, and forms the basis of supply in commercial quantities. From the seed supplied these two centres last year each member has from 60 to 200 bushels of this seed. Providing each member has complied with the regulations of the C.S.G.A. it will readily be seen how rapidly large quantities of Registered seed may be produced in a given centre. To some it might appear that difficulty would be encountered in securing a sufficient number of men who would make desirable members for the C.S.G.A. in a given locality. From the standpoint of the attitude of the farmers who took up the work in Carleton County last year, in the general care and handling of their grain crops, this contention is not borne out. Twenty-five farmers entered into this work in 1913, and of this number only one member was not recommended as a desirable candidate for membership of the C.S.G.A. They were all good farmers, painstaking and deeply interested in crop improvement and in the majority of cases, their farms were above the average as far as freedom from noxious weeds was concerned.

The establishment of Seed Centres is however not without its difficulties, and one of the main problems is that of getting men into these organizations who will systematically and conscientiously carry on the work from year to year in spite of the fact that they may be exceptionally good farmers when producing crops in a general way.

In connection with the Seed Centres that have already been established, there appear to be a number who have taken advantage of them for the sole purpose of renewing their own seed, from the best available source, and with no thought of carrying on the work of the C.S.G.A. or keeping up the standard of the crop, the seed of which they have thus secured. The great majority however are endeavouring to follow up the work, and in some cases where the selection has been followed, it is rather from a lack of a thorough understanding of what is required than from indifference.

The high standard set by the C.S.G.A. for registered seed is in a sense a stumbling block to many farmers, no matter how deeply they are interested in seed improvement. I do not wish to imply that the standard should be altered in any way, but many farmers feel that it is one to which they cannot reach. They are therefore oftentimes reluctant about taking up the work, knowing that after a careful following-up of the work for a number of years they are liable to encounter weather conditions or other adverse conditions beyond their control, which will prevent the crop qualifying for registration, and of no more value than grain produced in the ordinary way. This conception of the production of registered seed should not exist, and the establishment of Seed Centres where the work may be encouraged and its value demonstrated will tend to eliminate it. With the proper encouragement and more personal assistance being given to the members of the various Seed Centres the membership, as results are demonstrated, will be greatly increased and the supply of improved and registered seed greatly augmented.

It will be necessary to give the farmers forming these Seed Centres every encouragement and assistance until the centres become established on a sound footing, and the members begin to reap the benefit of their efforts.

MR. W. DAWSON: Anything I may say with regard to the Seed Centre is based on what I have gathered from a very limited experience as a district representative of the Ontario Department of Agriculture in Lanark county.

There are four words prominent in agricultural education, viz.: Organization, Co-operation, Demonstration and Education. Many might put the word Education first, but we find in district representative work that if we can organize the people, and get them to co-operate, we can, to a certain extent, educate by demonstration. When the question of Seed Centres was brought to my attention, I at once enlisted the services of Mr. Newman and endeavoured to organize one or two in Lanark county, and we were successful in laying the foundation for one which I think will prove quite a success. We secured for the boys who had taken a short course at the high school and who wished to compete in the acre profit competition conducted by the Ontario Department of Agriculture, some registered seed of the Banner Oat variety, with the hope that we could interest them in the work of the Canadian Seed Growers' Association, and at a future time organize a Seed Centre. There were fourteen of those boys in this competition, each taking two bushels and sowing it on one acre of land, with very satisfactory results indeed. The boy who won the prize obtained a yield of 72 bushels per acre. Ten of these boys completed the competition, and no less than eight of them promised to make the necessary hand-selection for next year.

The main object, as I understand it, of organizing a Seed Centre is to produce more and better seed. It is more or less difficult to organize at any time, but if we can put the organization on a business basis, we are more likely to have greater success. The Seed Centre gives us an opportunity to organize, gives us an increased production of better seed, and consequently an increased revenue.

I think perhaps one of the greatest difficulties which will have to be dealt with is keeping the seed pure. Very few farmers are able to do their own hand-selection. It appears to me therefore that one farmer will have to do the selection for the Centre, under supervision. By having one man select and grow the pure seed, he will form the basis of supply for the members of that Centre, and, I think, ensure the production of a better class of seed.

CONTRIBUTIONS BY DISTRICT REPRESENTATIVES OF THE SEED BRANCH OF THE DOMINION DEPARTMENT OF AGRICULTURE.

Seed Growing in Prince Edward Island.

(By G. LeLacheur, Representative for the Province.)

The season of 1913 has not been without difficulties which the seed grower must inevitably meet. The month of June was characterized by continued cold, wet weather, which killed out many of the less vigorous plants. But perhaps this "natural method of selection" may have been more conducive to the "survival of the fittest" than would many years of selection by the growers. At any rate the field inspection gave evidence of a survival of strong, vigorous plants, bearing large, well developed heads, although the thinner stand may have slightly lowered the total yield. The latter harvest weather was also very unfavourable, and thousands of bushels of the late ripening oats of ordinary farmers were badly weathered and in some cases badly sprouted. On the low-lying lands the scythe and mowing machine were resorted to in many cases for harvesting, and some was so threshed by wind and rain storms that it was left to rot on the ground. Most of the C.S.G.A. members, however, had seeded as early as possible in spring on fertile, well-tilled, well-drained soil, and consequently had their crop safely stored before "the rains descended and the floods came." The quality of the registered seed this year is therefore very good.

One grower, who had sown oats after oats on soil too low in fertility, was advised to feed the product and purchase well developed registered seed for next year. Another was severely scored for seeding barley after oats on a similar soil, and a question was raised as to its being eligible for registration. A few object lessons of this nature should demonstrate the futility of sowing expensive, high class registered seed on a soil which is likely to produce only poor quality feed grain.

Diseases also took some toll, notably the smuts, rusts and blights. We are pleased to report that most members keep their seed well and frequently treated for smuts. As a preventative against rusts and blights, the attention of a couple of members was drawn to the location of the seed crop on low-lying or poorly-drained soil in close proximity to swamps or streams. Different stages of unknown diseased specimens of wheat and oat plants were sent to the Dominion Laboratory of Plant Pathology for examination, and the following report was received:—

"The wheat ears are affected by a number of fungi (Cladosporium, Macrosporium, Fusarium). These discolour the ears, and also cause to some extent shrivelling of the grain. They are generally worse in wet seasons. Badly developed kernels are very liable to carry the fungi either in them or on them, and if sown the succeeding season lead to the spread of disease in the crop. Apart from rotation, it is necessary to give very careful attention to the quality of the seed sown. All light-weight and shrivelled grain should be eliminated for the reason stated, and seed treatment with formalin as for smut should be practised. This last destroys the spores of fungi which may be adhering in large quantities to the surface of the grain."

"It is more difficult to explain the appearance of the oats. The trouble seems to have occurred late in the season, as all the spikelets of the ear seem to have developed kernels, whereas when early conditions have been unfavourable, much of the ear very often does not fill at all. There is an abundance of fungus present on the leaves, but this, I think, is purely secondary, the leaves

having already become dead or unhealthy. I believe the cause is physiological, and probably due to associated weather and soil conditions, although I cannot be more specific without knowing details. I have, however, frequently seen similar effects produced on low-lying spots or where the subsoil was more impervious when much wet weather early in the season had been followed by drought. The excessive moisture hindered the formation of a vigorous root system, and then when drought subsequently occured, the roots were insufficient to meet the needs of the plant. Probably some such explanation would hold in this case".

A soil examination of a number of the spots of oats so affected revealed a somewhat impervious clay subsoil, and the fibrous roots appeared as if they had been killed. This investigation emphasizes the importance of methods, practices and treatments recommended in the literature of this Association.

Another difficulty which might be mentioned in passing is that of selection of wheats. The multiplying fields of four members were reported as being unfit for registration. Bearded and red chaff wheats were found in White Russian; compact square heads and long open heads were found in White Fife. It would appear that selection from our composite varieties of wheats offers too great difficulties for many of our farmers. If growers could be supplied with pure-line or well-fixed strains or varieties for multiplying in their purity, difficulties would be greatly simplified.

A survey of seed growing in the province indicates general progress and an awakened interest in the production of seed, especially of Banner Oats. This is the chief seed exported, with occasionally some wheat and timothy seed. The acreage devoted to seed oats has increased this year, owing to the recognized superiority of the Island product in the Eastern Provinces. The lesson received by the Nova Scotia, New Brunswick and Quebec farmers with the poor germination of some Western feed oats used for seed in 1912 has made them willing to pay a higher price for the better article. With the greater use of improved seed and the better cultural methods stimulated by field crop competitions, the total output and quality has increased accordingly. One Island firm exported over 150,000 bushels of seed oats in 1912, paying 44 cents upward. Most of this was grown on soil which would produce a high quality of registered seed worth anywhere from 75 cents to $1.00 per bushel.

This money argument was used on prospective growers of registered seed, with the result that some thirty odd additional names were obtained as growers of registered Banner Oats for 1914. These are all progressive farmers, most of whom have been successful in field crop competitions. They are buying as foundation stock either first generation or Elite Stock Seed, and will renew their stock as required by the rules of this Association. They will thus be growers for members who will devote special attention to the production of stock seed. In this way a beginning was made in the organization of seed centres. One of these men writes that his 30 acres of Banner Oats yielded during the past season, an average of 75 bushels per acre, and 70% of the total classed as seed according to the rules of the Banner Oat Club.

This club is an organization of those farmers whose seed crop comes up to a certain standard according to the scoring of the field crop competitions conducted by the Provincial Department of Agriculture in co-operation with the Dominion Seed Branch. The Secretary for Agriculture is also secretary of the club. This year the entire product, about 20,000 bushels, was sold to one firm at 50 cents per bushel right from the threshing machine, which is a considerable advance over feed oats rated at 35 cents. The members grow only the Banner variety, so that there is no danger of mixing. The purchasing firm graded out with a power cleaner from 30 to 60 per cent, depending on the quality. The firm must bring the standard up to the requirements of the club, whose inspector stamps each sack with the name "Banner Oat Club." New members are being

added each year by the field crop competitions. The experienced membership of this club makes excellent recruits for the growing of registered seed, and it is from this source that most of the new growers were obtained for 1914.

The Consular Trade Review of Prince Edward Island gives the 1912 production of oats as 7,000,000 bushels. It reports that the C.S.G.A. and the work of the Seed Branch are influential in raising the local standard of seed oats, and the prospects are that the trade will soon attain very large proportions. The Seed Commissioner is responsible for the statement: "The seed grain and the seed exhibitions of Prince Edward Island are not surpassed in Canada. We venture the statement that the Island soil and climatic conditions assist the grower in the production of an oat equal to anything in Scotland."

The same conditions are ideal for the production of the best quality of seed-potatoes for the hotter, drier climates of old Ontario and the Southern States. Farmers in 1912 reported average yields of over 400 bushels per acre, and during the past season one of our members, Mr. Peter Brodie, of York, had an accredited yield of 623 bushels 6 lb. per acre of the late Puritan variety grown under field conditions. Owing to the insular situation and peculiarly favourable conditions, potato pests and diseases are not a serious menace. Under these circumstances it would appear that "The Island" might become as famous for its registered seed oats and potatoes as it is now for its Malpeque oysters and domesticated fur-bearing animals.

Seed Growing in New Brunswick and Nova Scotia.

(By S. J. Moore, Truro, N.S.)

Interest in registered seed, or seed produced directly from registered stock, is steadily growing in the provinces of New Brunswick and Nova Scotia. One evidence of this is the satisfactory increase in our field crop competitions during the past year. In New Brunswick the counties holding them increased from 5 to 7. The number of fields increased about 50 per cent. In Nova Scotia the counties participating in these competitions increased during the year from 8 to 13, and the aggregate number of fields of oats entered from 91 in 1912 to 165 in 1913; fields of wheat from 42 to 73, and potatoes from 17 to 47. As these competitions are by counties and not conducted locally by agricultural societies, they represent a considerable territory in the two provinces. Judges report a marked improvement in purity and quality of seed used over former years. Very few, unless they are entering for the first time, think of competing without registered seed or something produced directly from it. All this means a greater demand for the best seed obtainable. The increase in this work is largely due to the co-operation and assistance given by the Provincial Departments of Agriculture, each of which for a short time put a man in the field in the interests of the competitions.

During the past season we had 41 farmers sign applications for membership in the C.S.G.A. These men were all visited either by Mr. S. M. Fiske for the New Brunswick Department of Agriculture, Mr. Harry Brown for the Nova Scotia Department, or by myself. In some cases we found applicants without the proper stuff to start with in the way of registered seed. They were advised to wait a year until they could get it. We think the time has gone by when we should start a man with any old seed he may happen to have on his farm, and have him spend years in trying to make it as pure and productive as seed he could purchase at a reasonable price from a member of the C.S.G.A. In fact, to take pure registered grain and keep it so should not require nearly as much skill as to take a lot of grain of a mixed character, isolate the desirable and eliminate the undesirable. As our strains and varieties, although decreasing in

number, are yet too numerous, we think any work of this sort unnecessary. In this connection I am pleased to note that farmers in our district are fast giving up the idea that new varieties will yield abnormally large crops under all conditions. This is largely accounted for by a great number of the farmers obtaining seed which has produced maximum yields under the best conditions. At our largest local seed fair, held in Antigonish in February, wheat and oats were practically reduced to two varieties each. At the fair held 7 years ago, there were not less than 6 varieties of the former and nearly a dozen of the latter.

At a meeting of the members and applicants of the C.S.G.A. held in Antigonish, June 24, 1913, a local association was formed for the encouragement of the production of registered seed. In a year or two this should result in a good seed centre. Most of the members intend to produce Banner Oats, White Russian and Red Fife wheat, and many of them potatoes. The officers of the Association aim to have every new member supplied with the right sort of grain to start with, and to have each section provided with an up-to-date fanning-mill for grading the seed. These men are not likely to produce quantities of seed—perhaps in most cases 5 or 6 acres each; but I believe it is from the farmers who carefully look after a small acreage that we may expect our purest and best seed.

Our seed fairs in the district have increased by one in each province and in most cases those already in existence have increased the number of exhibits. The Seed Exhibition at the Maritime Winter Fair at Amherst, N.S., December 8-11, filled all the old space as well as part of that formerly allotted to the fruit exhibit. The general competition had 245 entries, those by members of the C.S.G.A. numbering 90. In spite of adverse weather conditions in many districts, the quality of the exhibits was well up to the mark.

The Annual Meeting of the Maritime Province members of the C.S.G.A. on December 9 was well attended, and a lively interest was evinced in the proceedings.

Annual Exhibition of Selected Seed by Members of the Association resident in the Maritime Provinces—Amherst, N.S., December, 1913.

The Annual Exhibition of Selected Seed by members of the Association resident in the Maritime Provinces was again held in connection with the Maritime Winter Fair at Amherst, N.S., in December. The prizes offered in this competition were provided by the Maritime Winter Fair Board. Formerly these prizes were paid directly by the C.S.G.A., but this year an arrangement was entered into by which the prizes shall henceforth be paid directly out of the funds of the above Board. Classes were provided for sheaves of hand-selected plants, and for exhibits of threshed grain. There were also a number of classes for different types of potatoes and for corn. The quality of the exhibits was better than ever before, while the number of entries was also greater. The silver cup donated by the William Ewing Company, of Montreal, for the best exhibit of wheat, was won by John P. Harrison, Maccan, N.S. The silver cup donated by the Steele, Briggs Seed Company for the member making the most creditable showing of registered grain, was won by W. L. McFarlane, of Fox Harbour, N.S. The silver cup donated by S. J. Moore, Truro, for the best arranged and selected group exhibit of white oats was won by John A. McDonald, Maryvale, Antigonish county, N.S.

Minutes of the Ninth Annual Convention of Members of the Canadian Seed Growers' Association Resident in the Maritime Provinces.

Amherst, N.S., December 9, 1913.

The Ninth Annual Convention of the Maritime members of the Seed Growers' Association was held in the Board Room of the Winter Fair Building, Amherst, N.S., on December 9, 1913, at 2 p.m. A fair number of seed growers and other persons directly or indirectly interested in seed growing were present. Prof. Cumming occupied the chair, and in opening the meeting made the following remarks:—

"We meet this afternoon at this annual convention of the members of the C.S.G.A., resident in the Maritime district, and we expect to have an interesting and valuable meeting. I have no hesitation in saying that the best work which has been done during the past few years on the farm has been done along lines of seed improvement. This is the most effective line of work carried out in the Maritime Provinces, as well as in other parts of Canada. In this work we have been backed by the Federal Government, and a good feature of the work is that every farmer, no matter how reduced his means may be, can take part in it. When the question of pure-bred live stock is put to some farmers, they say they cannot afford to go into that kind of work, but when it comes to seed, etc., every farmer must use that, and it is noteworthy more this year than ever before, that the movement is gaining ground in our country, and in the whole three provinces farmers are realizing more than ever before the necessity of sowing the best quality of grains, potatoes and so on."

The Chairman then called upon S. J. Moore, Dominion Seed Inspector for the Maritime Provinces, who commented upon the importance of having so many of the agricultural students present at the meeting, of which their Principal was Chairman. "These," he said, "were the young men we must look to to carry on this work. The best men to-day who are carrying on this work are either graduates of agricultural colleges or have attended one or more short courses at the same."

Mr. Moore then read a paper contributed by Mr. S. M. Fiske, entitled: "Field Crop Competitions in New Brunswick." This paper will be found on page 94 of this report.

Mr. B. H. Landels, of the Nova Scotia Agricultural College, then read a paper entitled, "Importance to the Farmer of Growing his own Seed Grain." For this paper see page 95 of this report.

The Chairman then called upon the Hon. Mr. Burrell, Minister of Agriculture for Canada, who spoke briefly as follows:—

"I esteem it a privilege to speak to these men, and to express my hearty sympathy in the work of the selection of pure types of seed. Every one knows that one of the tragedies of the farm is the large amount of toil put into farm work, so much of which is unnecessary. I do not think there is anything which shows up so much for good as does the careful selection of seed. I can conceive nothing which would be doing more good to men like yourselves, who are giving so much labour to agricultural work, than will the selection of pure seed. I am glad to say, as Minister of Agriculture, that I shall be only too pleased to render any assistance in order that the work may be extended by those who are carrying it on. I am very glad to hear that in the Maritime Provinces this line of agricultural work has stimulated so many in agricultural operations, and is doing a great deal for the Maritime Provinces. I can wish you most cordially all the success you deserve, and appreciate the privilege of saying these few words to you."

Dr. MacPherson, of St. Francis Xavier College, Antigonish, was next called on to present his paper on "The Possibilities of a Seed Growing Centre in Antigonish county." This paper will be found on page 97 of this report.

Hon. Murdoch McKinnon, Minister of Agriculture for Prince Edward Island, was then introduced to the meeting, and spoke briefly as follows:—

"I am very much interested in seed growing, and in the Seed Growers' Association. Prince Edward Island is taking great interest in the raising of grain. This is an age in which we move very swiftly, but in Prince Edward Island we are moving more swiftly in seed lines than in anything else, which is due to the organization of the C.S.G. Association. Seed fairs have also done a great work, and have stimulated the people in growing good seed not only for themselves, but for the market. On account of the experiences of members of the Seed Growers' Association, a number of growers have formed what they call the "Banner Oat Club," for the purpose of seeing that nothing will go out under the name of 'seed,' but the very best. This organization has been very successful. Last year they sold their seed at an advanced price, and this year have sold a great deal. The Seed Growers' Association has done a great work, and I look for still more in the future than in the past, although the past has been more than up to our expectations."

Mr. Donald Innes: "At first I thought I had to change my seed every few years. Then some one spoke of hand-selection. I believe every farmer should have a seed plot of his own, and the only way to keep up the standard of pure seed is to have a seed plot and keep that seed plot for your own use and not sell it. Referring to Dr. McPherson's paper, I have judged in several counties for a number of years, but found Antigonish county the most uniform of all. The only way to keep clear of noxious weeds is by using hand-selected seed. In judging fields of grain, I always look for purity, uniformity and freedom from weeds, especially when the crop is grown for seed purposes."

Mr. Robert Kaulbeck, called on by the Chairman, discussed the importance of demonstration work and the good work done by the field crop competitions. The Seed Growers' Association had done great work in Halifax County, and their idea was to make every farmer hand-select his seed. There should, he thought, be a seed plot on every farm. In the field crop competitions the competitor should not be after money alone, and one of the rules should be that if he wants to enter the competition, his grain should be hand-selected.

Mr. E. D. Eddy, Chief Seed Inspector, Ottawa, Ont., congratulated the growers on what had been done in the Maritime Provinces along the line of seed selection. While a good deal had been accomplished, there was still much to be done. Experience in connection with the work of the Seed Growers' Association had shown that one cannot make a seed expert out of every farmer. For this reason it would be inadvisable to confine field crop competition work to those working in strict accord with the regulations of the C.S.G.A. It was interesting to note, however, that members of this Association provided the main source of seed for the field crop competitions. He said that the main weakness in these provinces is that the seed sown is very badly mixed. For this reason, members of the C.S.G.A. who had been competitors in field competitions, had almost invariably won, on account of the superior purity of their stocks. Last spring, our inspectors were instructed to collect samples of seed which was being sown by different farmers throughout the country. On examination of these samples it was shown clearly that the average man does not give the matter of choice of seed the attention which he should. Many of the samples examined showed that the grain should have been graded 35 to 50 per cent closer before sowing. The sowing of uncleaned and ungraded seed had been shown to result in serious losses. Mr. Eddy was strongly of the opinion that men who desire to grow the best class of seed should begin by obtaining pure stock either from an Experimental Station or from a member of the C.S.G.A. If all competitors

were to start in this way, a goodly quantity of relatively pure seed would be available for sale from the fields of the different competitors. In this connection he strongly urged the limitation in the number of varieties, and advised the farmers to get together and decide upon the variety which should be adopted in each district.

Mr. J. B. Daggett, Secretary for Agriculture for New Brunswick, advised that the Seed Growers' Association had the full and warm sympathy of the Department of Agriculture in New Brunswick. "Long before I came into my present position," he said, "I was aware of the interest in the work being done along these lines. I realized that great good was being done in this important feature of seed selection. The fanning mill has also done a great deal for the farmers of our province. The great drawback to farming in New Brunswick has been the lumber industry, and it is only now that we are coming to realize the real conditions of agriculture and are now making rapid strides along this line. This year we had two competitions more than last, and every competition is growing more interesting. Our watchword in New Brunswick is 'Quality, not Quantity,' and we are telling every one that 100 bushels of grain of good quality is better than 500 of poor quality. In quality we can make the Maritime Provinces the banner provinces of the Dominion. We are desirous of making New Brunswick the best in the Dominion, and we will do anything to help this movement along."

Mr. R. P. Steeves, Superintendent of Elementary Education in New Brunswick, said that the thing that struck him most forcibly was that the hand-picked seed is the real key to the seed problem. Good clean seed, he thought, would make for the best farming industry. The using of seed year after year in the place where it had been developed was another matter which seemed of importance. He believed that we must teach the children to select good seed, as they are the ones who are to carry on this work in the future. The Seed Growers' Association was, in his opinion, doing a great deal for the Maritime Provinces.

Mr. J. A. Clark, Superintendent of the Experimental Farm, Charlottetown, Prince Edward Island, also gave a short address in which he eulogized the work which the C.S.G.A. was doing throughout Canada.

Field Crop Competitions in New Brunswick.

(By S. M. Fiske, Florenceville, N.B.)

The field crop competition started in New Brunswick in 1910 and the work was carried on in five counties only. Since then the work has grown, till in 1913 the entry list has almost doubled in each county and two more counties have been added to the list. The counties which have had the enterprise to take up this work are: Kings, York, Victoria, Northumberland, Westmorland, Kent and Carleton.

The last two mentioned have come into the competition for the first time this year, and have entered into the work so enthusiastically that their entry lists have rivalled any of the others.

The results so far have shown marked improvement in the quality of the seed sown and also in the methods of handling and of cultivation. In fact, some of the farmers have got so many new ideas that they are actually starting a private seed business—for example, one farmer in Northumberland county sold all his Competition oats for 75 cents per bushel, and could have sold more.

In judging fields in the same counties for successive years, one is constantly coming across exceptional fields of grain and is invariably informed by the owner that the seed sown had been procured from the winning fields of the previous year.

The crops in the competition vary in the different counties and include wheat, oats, barley, buckwheat, potatoes and turnips. In the southern part of the province very little wheat is raised on account of the difficulty of getting it properly milled. But it is possible to raise good wheat anywhere in the province. The favourite variety is White Fife, Red Fife and White Russian coming in for equal popularity. Oats are in competition in all the counties, and Banner Oats heads the list. In the matter of barley, the six-rowed varieties give most satisfaction, but in general the barley grown is not up to what it should be. Competition work in turnips is converting the care of that crop from a drudgery into a pleasure.

The potato competition is of the greatest importance to the province of New Brunswick at the present time. New Brunswick potatoes are destined to win a world-wide reputation. The best field visited averaged eighteen (18) marketable potatoes to the hill. This field was in Northumberland county, where the competition is carried on according to methods recommended by the Canadian Seed Growers' Association. The buckwheat competition is peculiar to York county.

It is worthy of note that in Kings, York and Carleton the winning fields of oats were grown from registered seed of the Banner variety.

So far, a large sum of money has been paid out in prizes, and up to the present no case has been found where a farmer has been refused his prize money.

The success of the movement throughout the province has been due to the untiring efforts of Mr. S. J. Moore, who is in charge of the competition for the Maritime Provinces.

Importance to the Farmer of Growing His Own Seed Grain.

(By B. H. Landels, N.S. Agricultural College, Truro, N.S.)

This paper is presented for discussion with the admission that it is not filled with new thoughts on the above subject, but only a repetition of oft-repeated truths. My excuse is the fact that a good thing is none the worse for being twice told.

In the season of 1912 many Maritime Province farmers suffered serious losses through the use of western grain for seed. To those men it is quite unnecessary to say "Raise your own seeds". The other side of the argument comes from the men themselves in the statement that partial failure of their crop in 1911 resulted in a scarcity of seed grain, so supplies must be bought. The situation resolved itself down to this: not every man need, should or can raise all his seed grain every year, but when he cannot, the supply should come from his neighbour's farm where conditions are similar to his own, and where he has watched the growing and handling of the crop. If he has to go still farther afield, it is obvious that the more closely he has been following the care, handling and selecting of that seed, the climate, the type and cultivation of the soil on which it was produced, the more surely can he judge whether it will be likely to produce the crop which he desires. This Association finds a great field of usefulness here, not only in the improvement of the seed of the farm on which the selections are made, but in its control of the conditions of seed production.

The lesson taught by the experience of 1912 has been of inestimable value, but there is still room for improvement. Some samples of Western grain were sent me in 1913, which were lacking in vitality, one sample having only about 30 per cent germinable seeds. Discussing this question with a farmer in the vicinity of Truro last spring, I was surprised to hear him say, "There was no frosted grain in the West *last* fall". I am not sure whether I undeceived him or merely confirmed his belief that my knowledge of such matters was of little value.

Why raise your own seed grain? It is a fact well recognized among live stock breeders that selection and breeding must go hand in hand with feeding and care if good results are to be obtained. No one expects to produce and maintain a large draught type of horse under the conditions which have produced the Shetland pony or the Broncho of our Western plains. On the other hand, forced feeding and hothouse conditions in general do not give us the most valuable animal. In short, to produce a breed, strain or family of most value it is essential that the conditions under which the work of improvement is done shall at least approximate those in which that particular animal is expected to do its work. Does the same apply to plants? It most assuredly does. In the final analysis the work of the animal breeder and that of the plant breeder are identical. The laws of heredity are essentially the same.

Most of our cultivated plants have been known in the wild state within the written history of man. Selection and cultivation have made them different and more valuable to-day. If this selection and cultivation has been and is being done for the purpose of improving the value of these crops, is it not obvious that the conditions should be as nearly as possible similar to those under which the crop is expected to yield returns?

No seed grower likes to procure his seed from a country where the growing season is perceptibly longer and warmer, since that seed tends to be less hardy and to require a longer season for growth and maturity. Proof of this lies in the fact that Siberia and other parts of Russia have given to Canada some of the best varieties of oats that we have. Sweden stands next in line. In fact for the Maritime Provinces, the Swedish varieties may even beat the Russian. On the other hand, more unfavourable conditions than ours do not aid in making any variety or strain better suited to our own. It is true that the more rigorous the conditions, the easier it is to select from the plants produced those which have the ability to thrive despite these conditions. Even where man does not interfere, there is a process of natural selection resulting in the survival of the fittest. Fittest for what? Certainly the fittest to endure hardship and to make growth under adverse conditions, but not necessarily, in fact not usually, the fittest to make best use of those more favourable. The American Banner, an oat improved under conditions similar to our own, is perhaps the most popular variety in the Maritime Provinces, while the Daubeney, improved in parts of Canada where the season is drier than ours, is only a light cropper here. No certain family or breed of animals, after having been stunted in size and made more hardy by being forced to endure exposure and to subsist on scanty rations, can overcome this and grow to the full size of the breed in one generation of good care and full feeding. Neither can the plant. The fact that seed removed from poorer to better conditions gives more satisfactory results than the reverse order is not an argument in favour of the poor conditions, but leaves one free to assume that the continuance of the better conditions would favour still greater returns. If this were not true, what becomes of our theory of the adaptability of plants and animals to environment?

Can there ever be a reason for the bringing in of seed? It is possible. One can conceive of a climate or of soil of such a nature that it would not produce a good grade of seed of some certain crop or variety of crop, and yet this crop or variety might give reasonably good returns from the feeding standpoint. Such cases are rare with us, if indeed they exist at all. It is usually a crop of doubtful value from any standpoint which will not give us a good quality of seed.

Wheat produced in the Maritime Provinces does not give as hard a grain as the same varieties grown in the West, but is likely to give a relatively higher yield. The oat grain weighs heavier per measured bushel than the same variety if produced in Quebec or Ontario. None of the grains transfer the food from the stock to the seed on maturing quite as completely in a moist as in a dry climate,

or perhaps it would be truer to say the stock continues to take up and manufacture food for a longer period. It is thus evident that the Maritime Provinces have both advantages and disadvantages as a grain producing country, but it is also evident that we cannot hope to overcome the disadvantages by going outside for seed except when one wishes to try out some variety not now grown. It also follows that the advantages which this country has will not be given a chance to be properly proven if we continually go outside for our seed grain. Such procedure does not spell progress, but stagnation on our part. I might go on illustrating this point with many examples of seed grain which have not given uniformly good results when first tried, that have increased in value year by year. Marquis wheat is said to have given a more satisfactory crop in the Maritime Provinces this past season than it has before. Gold Rain oats, recently brought from Sweden, are giving an increasingly good account of themselves on our light, sandy soil at Truro. Probably many seed growers here will corroborate these and other experiences from results on their own farms, and such discussion is bound to be much more valuable than a continued paper.

The Possibilities of a Seed Growing Centre in Antigonish County.

(By Rev. Dr. Hugh MacPherson, St. Francis Xavier College, Antigonish, N.S.)

The question I am to discuss is whether the conditions are favourable in the county of Antigonish for the production of high-class seed in such quantities as will supply whatever local demand there may be, and also enable farmers to place seed on the market in carload quantities.

Before answering the question in the affirmative, as I am going to do, I may be permitted to say that there is noticeable in Antigonish, as indeed in other parts of the province, an awakening in the agricultural life of the community. This is very apparent to any observant man who is in touch with the community. Among our best farmers especially, in fact, among all classes, there is increased interest in the work of the farm and an optimism and quiet enthusiasm which give promise of good developments in the near future. The farmers seem to be ready to enter heartily into any advanced movement and are desirous and eager to take hold of new and better methods.

With nearly a century gone by since pioneer days, we are yet only young as a community, and as with all beginnings, development is at first slow and on general lines; but already differentiation is taking place, tendencies are showing themselves, organization is the order of the day. A sign of this growth is the fact that specialized work is being taken up, and it seems to me we struck our specialty, at least a good special line, when last summer we organized a local branch of the Canadian Seed Growers' Association. This club was started with a membership of about twenty, with enough more members in sight when we are ready for them. Our work is nearly all ahead of us, but we can see no difficulties big enough to prevent us in a few years from having a smart seed producing community. Our object will be, of course, to produce seed under the rules of the Canadian Seed Growers' Association, to help one another in the task by each other's experience, and to co-operate in the disposal of the product. The members are starting with cereals only. When we get well under way, it is probable that some other seeds will be taken up. Antigonish is a good county for potatoes and other roots. Some fields could have been seen this year from which clover and timothy seeds might have been gathered and the possibility of propagating a native strain of alfalfa has on more than one occasion been demonstrated.

We have this advantage in starting, that there are among our number some who have been members of the Canadian Seed Growers' Association for years and whose experience will be invaluable to the beginners.

Now, as to the adaptability of Antigonish for this work. On the live stock side of farming there is a strong tendency towards dairy stock, and this would seem to go admirably with seed growing. To keep up the fertility of the soil there is nothing better than the dairy cow, and fertile soil is a first essential for seed growing. On the other hand, good seed for the farm crops is just as necessary to produce plenty of feed for the cow, and seed for the market is an excellent cash crop to supplement the income from the dairy. And let me remark that a suitable money crop has an important place in the economy of the farm, and that high-class seed seems to be a most suitable one for our county, especially for such farms as are a considerable distance from the railway. Nor will the objection against selling crops off the farm hold when there is a question of such a valuable article as high grade seed. Its feeding value can be replaced at a much lower price.

Looking at the problem in the abstract, the elements upon which the formation of a successful seed growing club depends, would seem to be: the land, the climate and the men. Of suitable land we have plenty beyond question. True, some of it has been "run out" by injudicious methods of cropping, but even that will respond generously to proper treatment.

Without going into detail as to soil, I may say that a large percentage of the area of the county is good soil, capable of being brought into a high state of cultivation. About one half-of it is underlain by limestone, a considerable area by shale, and a smaller area by sandstone and crystalline rock. There are several types of soil. In the meadows or intervals there are alluvial soils. The uplands are mostly various grades of clay, which make strong retentive soils. The faces of the hills are often gravelly. The topography or 'lay' of the land is also an important feature. To present the best conditions for cultivation, to get an even stand and even maturity, the land must be level and of the same quality. Not only do our meadow lands possess this important feature, but also the same condition can be secured on a large proportion of the upland. Beyond the elevations which rise from the valleys, are stretches of comparatively level land where excellent cultural conditions can be procured.

In climate there is no essential difference between our county and the rest of these provinces. In the springtime the land is probably a few days later in "warming up" than in the counties west of us, on account of the ice which sometimes packs on our North shore. This drawback may in part at any rate be offset by drainage. In any case the condition could be taken advantage of for the natural selection of hardier strains.

In regard to the third very important element—the people—I think I may say that when they take hold of a thing they have the intelligence, determination and energy to carry it through.

Of more practical importance are the steps to be taken to convert our possibilities into actualities. Inducements in the way of a good market are open to us, and the various exhibitions, fairs and field competitions provide a stimulus and give zest to the work. It must be recognized that the work of producing high-class seed, like that of producing high class stock, calls for the exercise of the highest form of the husbandman's skill. With an army of scientific men both at home and abroad at work on this question, the course to be followed has been made clear. There is, however, still quite a chasm between the laboratory of the man of science and the ordinary man's farm. We are in hopes that our new club will help to bridge it over. But a great deal of practical work must be done. Good foundation stock must be procured. The beginners have a whole lot to learn about judging, selecting and preparing

the seed plot, and the multiplying fields. All this will involve much work and demonstration on the part of the officers of the C.S.G.A., and of all who are interested in the promotion of this good cause.

Nor should the value of meetings and discussions be overlooked. It would be of much advantage to those who are now engaged or are about to engage in seed growing to come together as frequently as possible. Scientific men could explain to them the vast importance of improvement in seed, and the laws upon which plant improvement rests. Talks could be given on the advance that has already been made at home and abroad, on the questions that are still awaiting solution, so that all might participate in the wonderful interest that attaches to the whole work. An evening a month devoted to a discussion of this kind would prove of interest and value.

QUEBEC DISTRICT.

Seed Growing in Eastern and Northern Quebec.

(By J. A. Simard, Quebec, P.Q.)

I take great pleasure in submitting to this Association a report on the progress of the work in the eastern part of the province of Quebec.

The season of 1913, as compared with 1912, has been very favourable to seed growing in Quebec, especially in the eastern part of the province.

Records, based on most reliable observations, show an increase of at least 25 per cent of the general crop, and still more in all cases where the seed grain had been judiciously selected the years previous, it being pure and of good quality, whereas commercial seed, as a rule, was deficient in many respects, this being shown by a large number of tests. The increase of the crops from this common seed is due rather to the favourable weather conditions, and would have been larger if the seed had been of first quality.

Besides visiting the old members, I had the pleasure of visiting also fifty applicants who were selecting for the first time. Every one of them had a very good looking seed plot of not less than half an acre. Some of them, however, may experience some trouble in the future on account of some black oats mixed with the foundation stock we imported last spring. To eliminate these black oats the growers have been asked to pick them all out of the seed before seeding down the hand selected seed plot this spring.

The careful work of some of the above mentioned applicants, as well as that of the members, was clearly shown at the seed grain exhibitions, both provincial and local. They were easy prize winners in every class in which they exhibited. The same thing occurred in the field crop competitions. Wherever a member of the Association entered the contest, he won the first or second prize. These results convince our members and applicants, as well as their neighbours, that it really pays to sow good seed on well prepared land.

One farmer who started selection last year complained to me about his failure to win a prize in the field crop competition, in spite of his best efforts. I told him that he had never sown any good and pure seed oats. Following my advice, he bought last spring 10 bushels of first-class seed, which he sowed on well prepared land, with the result that this year he not only won the first prize at the field crop competition, but also one first and one second prize at the Provincial Seed Exhibition.

The group exhibits were not represented in very large numbers, as the older members only have the right to compete in this class, and they are still very few. There will no doubt be more next year.

The class for boys and girls and the class for exhibits of one bushel and half bushel open to applicants were relatively well represented.

Since I took charge of the work in the eastern part of the province of Quebec, I have had in view the centralization of the work through the organization of "Seed Centres" as suggested by the Secretary of the Association. So far, eight such centres have been formed in my district, each centre consisting of not less than eight farmers. In order to succeed in this line, the work done in these centres will have to be followed and looked after very closely, which will involve a great deal of work. In order to facilitate the necessary supervision, it has been decided for the future to organize these centres in districts where district representatives of agriculture are located. The co-operation of these officers and their supervision of the work of the growers will undoubtedly help us to secure the best results.

.From interviews I have had with these agriculturists, I can say that they are all very enthusiastic over the work. Three centres have already been formed in their respective districts.

A couple of centres have also been organized in the Lake St. John district. One of them will produce Daubeney Oats, which we have been fortunate enough to secure from Prof. Klinck. Most of our other best varieties, even the Banner, seem to be too late for that region, and we hope that the Daubeney will prove very satisfactory.

In closing, I may say that there is a tremendous field for the work of seed growing in the province of Quebec, and that the farmers in general are beginning to realize that it really pays to devote more attention to this important branch of agriculture.

Seed Growing in Western Quebec.

(By C. Sweet, Sherbrooke, P.Q.)

In this paper I shall, in accordance with the Secretary's request, speak more particularly of corn growing, and the experimental work carried on in my district in testing different varieties of Ensilage Corn.

Generally speaking, the conditions during the past summer were quite favourable to crop production in Western Quebec, with the exception of clover.

May opened very warm, crops were gotten in early, and towards the latter part of the month it turned colder, with a frost following the first week in June. To these conditions we attributed our clover failure, as this crop, having started nicely, was practically killed owing to the setback received by the frost occurring so late in the spring season.

As a means toward avoiding a repetition of last year's failure, the Seed Branch encouraged the introduction of a hardier variety of Red Clover. Accordingly, over 500 lb. of clover seed of a particularly hardy variety, called Swedish Late Red Clover, or Single Cut Clover (Trifolium Pratense) was brought in from the General Swedish Seed Company of Svalöf, Sweden, and will be sown this spring. It is hoped from this importation to produce home grow seed and establish a clover crop that will withstand our climatic conditions.

After attending the Corn Show at Windsor in 1913, I decided to conduct a number of experiments with different varieties of the earliest Ensilage Corn, to determine those best suited to our district. From Messrs. Bigger, Hankinson and Duke, of Southwestern Ontario, I obtained seed of different Dent and Flint varieties, and conducted trial tests with farmers in the counties of Missisquoi, Brome, Sherbrooke, Drummond, Stanstead and Compton. Four Flint varieties and six Dents were tested near Hillhurst in Compton county, on the farm of Mr. J. A. McClary, one of the so-called "Illustration Farmers" working under the direction of the Commission of Conservation. The seed of these varieties was obtained from Essex county. The crop produced from this seed was excellent in so far as foliage was concerned, but the production of grain

as well as the quality of the grain was of a low order. An examination of the data submitted shows that the ears of Flints shrank on the average 79.5 per cent from September 16 to November 7, while the Dents shrank 84.15 per cent during the same period. The total fodder produced by the Dent varieties, including the ears, shrank 48·9 per cent during the same period as above mentioned, thus:—

Wisconsin No. 7 yielded 20·8 tons green fodder including the ears, and shrank to 11·01 tons in three weeks' time—that is, 45·1 per cent. This variety also produced 3·27 tons of ears per acre, but these shrank in three weeks to ·48 tons, thus making a shrinkage in the ears of 85·3 per cent by weight.

Golden Glow yielded 20·69 tons of green fodder, but shrank to 9·96 tons in three weeks, or 52 per cent. The ears produced at time of cutting weighed 3·32 tons, but in three weeks had shrunk to ·60 tons, or 82 per cent.

Early White Cap produced 18·63 tons of green fodder, which shrank 9·80 tons, or 47·4 per cent. The ears produced weighed 2·35 tons, but in the above period shrank to ·30 tons, or 83 per cent.

Early Leaming produced 21·53 tons, which shrank to 10.04 tons, or 53·3 per cent. The shrinkage in the case of this variety was over 8 per cent more than that of the Wisconsin, as regards total yield. The shrinkage of the ears was also slightly greater than that of Wisconsin, being 86 per cent.

From these figures it will be seen that on this particular farm Wisconsin No. 7 seems to have given the greatest food value per acre. It is of course quite unwise to accept one year's work as at all conclusive. We must rather regard this data as suggestive.

GROWN BY J. A. MCCLARY, HILLHURST, COMPTON COUNTY, QUEBEC.

Variety.	Dates when weighed.	Total yield in tons per acre.	Per cent shrinkage in total weight.	Yield of ears in tons per acre.	Per cent Shrinkage in weight of ears.	Remarks.
Flints:—						
Quebec Yellow.....	Sept. 12....	13·55	.....	3·98	.....	
	Nov. 7....	6·17	57·4%	destroyed by mice...	.....	Quebec Yellow and N. Dakota. Sown about 10 days later than the others
King Philip.....	Sept. 10....	18·82	.....	2·11	.....	
	Nov. 7....	8·83	53·0%	·30	85·8%	
Longfellow.....	Sept. 16....	12·95	.....	2·12	.....	
	Nov. 7....	4·84	62·5%	·36	68·8%	
North Dakota.....	Sept. 12....	15·37	.....	2·29	.....	
	Nov. 7....	6·89	55·1%	·36	84%	
Average of Flints....	Nov. 7....	6·68	56·25%	·34	79·5%	
Dents:—						
*Wisconsin No. 7....	Sept. 16....	20·08	.....	3·27	.....	
	Nov. 7....	11·01	45·1%	·48	85·3%	
Golden Glow.....	Sept. 16....	20·69	.....	3·32	.....	
	Nov. 7....	9·96	52 %	·60	82·%	
Early White Cap...	Sept. 16....	18·63	.....	2·35	.....	
	Nov. 7....	9·80	47·4%	·30	83 %	
Early Bailey.....	Sept. 16....	17·42	.....	2·72	.....	
	Nov. 7....	9·56	45 %	·42	82·6%	
Early Leaming	Sept. 16....	21·53	.....	2·54	.....	
	Nov. 7....	10·04	53·3%	·36	86·%	
Early Huron.....	Sept. 16....	16·08	.....	·85	.....	
	Nov. 7....	7·86	50·9%	·12	86%	
Average of Dents.....	Nov. 7....	9·7	48·9%	·38 =4%	84·15% total.	

Above varieties on basis of figures quoted rank as follows:—King Philip among the Flints and Wisconsin No. 7 among the Dents. The latter also produced greatest value per acre everything considered.

*Effect of fertilizer especially noticeable here. On this field the application of 20 loads of barn-yard manure and superphosphate gave better results than nitrate of soda and manure or muriate of potash and manure.

On another farm, in Mississiquoi Co., near Bedford, P.Q., there were tested the following five varieties of Dents, viz.: Wisconsin No. 7, Early White Cap, Golden Glow, Early Leaming and Early Bailey. The original seed was also obtained from Essex county in the spring of 1913. The progeny of this seed was much better developed than were the ears produced on the farm just mentioned. The figures submitted with this test are hardly comparable with those just discussed, as the weights were taken at different times. However, we may make certain deductions as to the relative standing of the varieties grown in that particular district.

Wisconsin No. 7 yielded 14.9 tons per acre, but by January 22 had shrunk to 4.42 tons, or 70 per cent; the ears produced weighed 5.5 tons, but had shrunken to 2 tons, or 63.6 per cent by the above date.

In *Early White Cap* the ears weighed 4.8 tons per acre when cut, but on January 22 had shrunken to 2.42 tons, or 52.2 per cent.

Early Leaming produced 5.8 tons of ears, which shrank to 2 tons by January 22.

The proportion of corn to fodder by weight is of course very much greater in the case of corn grown on this farm than that grown in the former test. In the test under consideration, 44.4 per cent of the total weight of crop is made up of ears. In the case of the experiment first discussed, only 4 per cent of the total weight is made up of ears, and these were of a quality which did not add much to the value of the fodder. The difference in the development of these two sets of experiments on the different farms may be attributed to different conditions of soil and to cultural methods. They indicate clearly that the eastern grower can do a very great deal by way of cultivation, etc., to ensure a paying crop.

Of all the varieties tested, only the Quebec Yellow was able to reach maturity. The cold nights following the frost which occurred the first week in June hindered the growth during that month, and with a heavy frost on the 9th September, followed by three or four successive nights of frost, made it necessary to start cutting at once. Thus in 1913, the growing period for corn was about the same as it was in 1912.

From this year's test it is safe to draw the conclusion that the farmers of Western Quebec require the earliest strains of the earliest varieties of corn produced to grow even for ensilage purposes.

Before concluding this paper, I would like to mention that the Boys' Competition in growing ¼-acre plots of registered seed oats, mentioned in last year's paper, was, on the whole, very successful. The seed was furnished by the Canadian Seed Growers' Association, and 24 boys from Cookshire and Lennoxville Academies entered the competition, the plots grown by some of the boys scoring over 90 points. Prizes were given for the best sheaf and 10 lb. of grain selected from the seed plot and shown at Sherbrooke Exhibition. One director of the Exhibition remarked that this exhibit of oats surpassed any one class of grain ever shown at Sherbrooke in quality and appearance. About 40 per cent of these boys made hand selections from their seed plots to sow another similar area in 1914.

Minutes of Annual Meeting of Members of the C. S. G. A. Resident in the Province of Quebec.

Quebec, January 27, 1914.

The Annual Meeting of the Members of the Association resident in the province of Quebec was held in Quebec city on the above date. Mr. Labissonière, M.P.P. for Champlain, occupied the chair, and in opening the meeting, made a short address, which is submitted herewith as follows:

"GENTLEMEN,—It is my good fortune this evening to preside at this second Convention of the Seed Growers of the province of Quebec. The pleasure which this gives me is further enhanced by the fact that the convention is being held in the good old city of Quebec, the home of Louis Hebert, pioneer of all Canadian agriculturists, and from whence emanated the agricultural movement which is to-day so active in our province.

"There is no occasion for me to explain to you the objects of our Association. It has been in existence for several years, and you know as well as I do the good which it has done since its inception. At the same time, there is much left to do; we must aim at perfection, and it is in order to incite us to attain to this perfection that we are gathered here in convention.

"We shall have an opportunity this evening of listening to lecturers whose ability is known and appreciated by all agriculturists in the province of Quebec. From these addresses we shall gather a great deal of instruction, which will help us in the development of our farms. It is necessary that we should realize the importance of learning, of acquiring all possible knowledge, so that we may throw overboard all that is still left of routine in our methods of agriculture.

"The object of our Association is the selection of seed grain, and if we apply diligently the principles which it teaches us, we shall reap the advantage of a large increase in the yield of our soil.

"During the past year the number of members of our Association has increased considerably. This increase is due to the intelligent and devoted work of Mr. Simard, and you will permit me, in your name and my own, to congratulate him most warmly. He has, practically, travelled over the whole province of Quebec, and by his convincing arguments has influenced a large number of our friends to join the Association. At the same time, we might have many more members, and I am sure that if each one of us were to take a little trouble to help Mr. Simard in recruiting work, we should in a few months see our numbers doubled. Our aim should be to enrol in our Association all the farmers of the province of Quebec.

"The importance of co-operate effort is recognized by all other classes of society; finance, commerce, industry, all form themselves into powerful associations, and the agricultural class should also profit by the advantage of association.

"I would request you to hold a discussion at the close of each address, as announced on the programme, and I am sure that these discussions will be in the best interests of our Association."

The Canadian Seed Growers' Association and the Seed Trade.

(By G. M. Michaud, Three Rivers).

No one would have anticipated, about ten years ago, when the Canadian Seed Growers' Association started its work, the wonderful development it has attained to-day. The production of seed by its members has increased to a large extent, and, while the local demand has also been steadily increasing, the growers will soon have to adopt more rational commercial methods, in order to get the most out of their crops.

The creation of "centres" of production of improved seed grain in our province is another new and important factor in furthering the development of the Association. For the organization of these centres we are indebted to our devoted and untiring district representative, Mr. J. A. Simard. These organizations are bound to render immeasurable service to agriculture, by providing farmers generally and the trade with large quantities of seed of uniform quality and of the same variety. They will also help a great deal in the fight for the reduction of the large number of varieties of grain at present cultivated in our province, which is one of the most serious drawbacks of this branch of agriculture here.

The seed growers should therefore prepare themselves during the next few years, so as to be able to get better prices for their seed, and at the same time reduce the cost of putting their crop on the market. They should consider and discuss among themselves the pros and cons of the three following alternatives:—

1. Individual selling,—that is, each grower selling his own crop.
2. Selling through the seedsmen.
3. Selling through a co-operative society especially organized for the sale of seed grain, or affiliated with some agricultural co-operative society that may already exist in the district.

These three alternatives must be considered both from the point of view of the grower and of the buyer, as good trade facilities will greatly encourage the latter to become a regular customer, paying good prices.

Individual Selling.—This is undoubtedly the method of selling which entails the highest cost in cleaning the seed and in advertising, shipping, etc. Unless the grower is alone in his district, he will have much difficulty in building up his reputation, on account of the competition of neighbouring growers.

From the point of view of general production, this method tends to increase the number of varieties grown, which is already too large, as each grower, working for himself, is always tempted to try new varieties, in order to beat his competitors.

Selling through the Seedsmen.—This method is more expeditious for the grower and causes him less trouble and worry, especially where the cleaning and grading of the seed is done by the seedsmen. It also relieves the grower from all expense for advertising, and cuts down the shipping costs, but the price obtained for the seed is necessarily much lower.

In addition to these expenses, the seed merchant has to make his own profit. It is true that these costs are proportionately smaller for the merchant than they are for the grower, on account of the better equipment, larger quantities of seed handled and better business methods; but there are ways and means for the grower to reduce the above mentioned expenses, and to retain for himself the clear profit made by the dealer. These ways and means are offered to him through co-operation, the main advantages of which are as follows:—

1. Reduction of the cost of cleaning and marketing.
2. Reduction of the number of varieties grown in a certain district.
3. Ability to put on the market carload lots of seed, uniform and of the same variety.
4. Creation of a certain reputation for a centre of production of good, improved seed.
5. Better prices, as a result of the above advantages.
6. Rapid development of the growing of seed grain in the district controlled by the co-operative society.

It must not be forgotten, however, that organizing for the above purpose requires a thorough knowledge of the local conditions and of the trade, much discretion in the investment of capital for buildings and machinery, where this is necessary, perfect administration and management, and, last but not least, especially at the beginning of the enterprise, a good deal of self-sacrifice for the common cause, on the part of all concerned.

As it is recognized that co-operation in agricultural matters is the ideal condition for selling as well as for buying, and that this has been amply proven by the experience of all agricultural co-operative societies established on a sound basis, both in this country and abroad, it is hoped that these few suggestions may be welcomed by the members of the Canadian Seed Growers' Association residing in the province of Quebec.

MR. LAVALLEE: I note that Mr. Michaud stated that in less than four or five years the growers of seed would have difficulty in selling their seed grain.

Meeting of Cookshire Academy boys and others, including Mr. C. Sweet and the Secretary of the C.S.G.A. Held in field at edge of seed oat plot, Aug. 1913.

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Cookshire Academy boys receiving instruction in seed selection, etc., in the field, Aug. 1913.

I am not of Mr. Michaud's opinion, and I even go so far as to think that in four or five years we shall not be able to produce enough good seed grain for our requirements. I believe that far from troubling to seek for markets for our seed grain, in five years' time, farmers should rather be encouraged to produce grain for the local market.

MR. LORTIE: I am entirely of the opinion which Mr. Lavallée has just expressed.

MR. LAVALLEE: Mr. Couture, do you think that in four or five years' time we shall have difficulty in finding markets for our seed?

MR. COUTURE: I do not think so.

THE PRESIDENT: Do you mean to say that the demand will always be greater than the supply?

MR. MICHAUD: Mr. President, it seems that these gentlemen have misunderstood me, and that the discussion is not relevant. I did not say that in four or five years we should have no markets, but rather that we are beginning to sell our selected seed at less profit than we should be making, and could make if we used suitable methods of production and sale.

THE PRESIDENT: That is a very important point. In order to have selected seed, much careful preparation is needed—more careful preparation than we usually make; and the most careful preparation that we can make is not as thorough as that made by experts, i.e., by some one who examines the seed especially to make a selection.

MR. MICHAUD: Certainly. Now, supposing that the supply did not meet the demand, do you not think that a co-operative society such as I have spoken of in my address, would considerably help the farmers who devoted their attention to the production of seed grain? This society would naturally promote standing field crop competitions, would take care to put it in the hands of good farmers to begin with, who would multiply it; it would then repurchase the crops of these farmers and put them on the market on the latter's behalf. Do you not think that this would be a good idea? I do not know if I have made myself quite clear. I will presume that I am a farmer; that I have a neighbour who makes the selection; I buy the selected seed and sow it on my farm. It is then my seed, and my own business. However, I am not very conscientious, and allow my seed to get mixed; or perhaps I have not the time to devote to it, and it becomes infected with weeds. So it comes that in the third year,—since no one has said anything, it being my own affair—that my seed has deteriorated. That does not help much towards the production of good seed in the province generally, does it, and it is obvious that all the trouble I took to provide myself with good seed is entirely wasted. But if, on the other hand, a co-operative society buys my neighbour's selected seed on my behalf, and sees to its being multiplied by careful farmers, insisting upon the observance of certain rules as to cleanness of field, threshing, etc., so as to ensure a crop absolutely pure to put on the market, do you not think that the results would be different, and necessarily better than those obtained in the first instance I suggested?

THE PRESIDENT: I understand that the co-operative society would itself look after the classification of seed. That is your idea, is it not?

MR. MICHAUD: The co-operative society would be responsible for the purchase, classification and sale of the crops resulting from the seed.

Mr. LAVALLEE: Are you of the opinion that the co-operative society would have the effect of increasing the production of seed in general?

Mr. MICHAUD: Yes, that is my idea.

The PRESIDENT: Would a co-operative society have the effect of increasing considerably the production of good selected seed, and also the profits on sales? Those are two points to be considered. As to production, cleaning, classification and sale, would all that be done better through a co-operative society than otherwise? What do you think, Mr. Simard?

Mr. SIMARD: In this discussion I am afraid that we have been confusing matters somewhat. In his address Mr. Michaud spoke specially of the co-operative idea embodied in the Seed Centre scheme which was launched in our province last season and showed the advantages associated with such scheme. The discussion following this address however has digressed to deal chiefly with the more highly organized and complicate co-operative society system, as that system is known in this province. The latter system doubtless has many advantages and where it can be worked out, may safely be recommended. The seed-centre idea, on the other hand, is one which may be put into practice in almost any district where good seed can be produced and while it recognizes the co-operative idea in the cleaning and handling of seed, the machinery for its working out is more simple and practicable.

Mr. FOLEY: Under the present system, the seed merchant can buy seed of inferior quality and sell it solely with a view to profit, while under a system of co-operative societies he could not do this, for I understand that the co-operative society would have a competent man appointed specially to supervise the handling, so that nothing but guaranteed first-class seed could be put on the market, and perhaps in the end the farmers would find it to their advantage.

Mr. NAGANT: I wish to say that I think Mr. Michaud's idea an excellent one, in that under the co-operative system farmers would always be more sure of being able to procure seed of prime quality, whereas now, under the present system, there is not this assurance. But I understand that it is an important question whether the expenses of administration of a co-operative society would not absorb too large a proportion of the farmers' profits. In any case, it would not do to start at once on a large scale.

The discussion then continued on the question of whether it would not be more profitable for the farmers if the money spent on large graders were devoted to the purchase of smaller ones like that shown this year, these small machines to be distributed in as many parishes as possible.

Mr. F. N. Savoie discussed the value of a specially selected plot for boys and girls. He explained clearly the importance of such work, and urged the farmers as much as possible to endeavour to develop the taste for experimenting in the minds of the young people.

Mr. Gus. Pintal, of Champlain, pointed out the importance of cleaning and grading seed destined for registration. He first called attention to the necessity of sowing pure seed in clean and well cultivated land, and he showed how, by following the system of selection recommended by the Association, he had had very good success. He urged the farmers to put these methods into practice if they wished to succeed in seed growing.

Mr. J. A. Simard, of the Seed Branch, spoke on the formation of Seed Centres in the province of Quebec. In the course of his address he mentioned

some which have already been organized, and pointed out the good work they have done. He said that in future the time of the men in charge of the work of this Association will be devoted to the direction of these centres and the establishment of new ones. He also drew the attention of the district representatives present at the meeting to the necessity of securing their hearty co-operation in this work.

ANNUAL EXHIBITION OF SELECTED SEED.

The Annual Exhibition of Selected Seed by members resident in the province and which was also held in connection with the regular Provincial Seed Fair, attracted considerable attention, and proved a valuable feature of the work in the province. Mr. R. Summerby, of Macdonald College, P.Q., who judged the seed, has the following to say re the exhibition:—

> "I found the quality of the grain much superior to that of any that has been exhibited in former years during which I have been there. While it is true that one might wish for a greater number of exhibits, yet the quality would indicate that only the best was being shown. A noticeable feature as compared with last year was the freedom from other varieties. In some of the head selections there were a few other varieties, and in one or two cases an improperly named variety, yet there was a decided improvement over last year's exhibit. This, to me, held true of the whole exhibition, that is, there was more system and better organization than was the case previously, and taking all the exhibits through, there was a better and purer class of grain."

SEED GROWING IN EASTERN ONTARIO.

(By T. G. Raynor, Seed Branch, Ottawa.)

The summer of 1913 proved a good one for the production of good, sound, bright-coloured seed grain throughout Eastern Ontario. Where the seed was put in early and got off to a good start, the yield was good. Some few sections suffered extremely from the dry weather in June and later. However, on the whole the season's crop may be spoken of as a good average one in yield and above the average in quality. My work in the early part of the year in promoting the interests of the Canadian Seed Growers' Association was in organizing some seed producing centres in localities where the production of certain kinds of seed could be made a specialty.

The farmers of the localities visited realized the soundness of the arguments advanced in the cause of clean, pure seed, and in a few cases showed their desire to try out some plan of co-operation, by organizing a seed producing centre. Such organizations were encouraged even though only three or four men were prepared to make a beginning at a given point. There is no reason why in a short time, good registered seed may not be produced in carload lots in this way.

I did very little of the inspection work this year, as that work was turned over to the district representatives in agriculture, whose farmers were operating in their respective territories. Opportunities were afforded to speak a good word for the Association and its work at some of the short courses in seed and stock judging that I was privileged to attend.

The Winter Fair at Guelph, where the members of the Association of the province have the opportunity of showing what can be done in the production

of pure high-grade seed, gave further evidence of the value of the work last December. More of the members are competing, too, in the open classes at various exhibitions, and are found to be winning out in many of the classes.

While the general principles and policy of the Association are unquestioned, it seems very difficult to get the average member to take sufficient pains with the crop he is improving to make it so outstanding that every one who sees his seed will not only admire it, but want it, because of its grading and purity. There are two points the members usually fail in: they either will not, or do not know how to manage their fanning-mills so as to get all the light, chaffy stuff and inferior seed screened out: then there is the difficulty of getting it free from certain kinds of weed seeds, but more particularly from other kinds of grain which get mixed in with the crop or seed in so many ways. Greater care should be taken to weed them out of the growing crop. Here comes in the question of labor. The farmer is usually handicapped these days because of the lack of help to do all the work he would like to do, and consequently he neglects to look after this very important work at the right time.

The demand for registered seed has been so great and the supply so small, that sometimes the inspector has been too lenient in allowing a few seeds to pass both in the growing crop and in the seed when ready for market.

I feel it imperative that each member should live up to the highest standard for the sake of the work. I trust that the members may find their work increasingly profitable.

Annual Meeting of Members of the Association Resident in the Ontario District.

Guelph, December 11, 1913.

The annual meeting of the members of the Association resident in Ontario was held in the Council Chamber of the City Hall, Guelph, on Thursday, December 11, 1913, at 8 p.m., with Prof. C. A. Zavitz in the chair. There were twenty-six members present.

After the reading of the minutes of the last meeting had been dispensed with, the chairman appointed Messrs Hankinson and Hutchinson a Committee on Resolutions. The chairman then addressed the meeting with a few brief remarks in which he called attention to the special progress which had been made during the year along various lines, especially along the line of organizing seed growing centres. The programme, he said, had been arranged to provide for the receiving of reports from a number of district representatives of Agriculture who had taken special interest in this work. He then called on Mr. F. C. Hart of Galt, Ont., to report on the organization of seed-growing centres in Waterloo County.

SEED GROWING CENTRES IN WATERLOO COUNTY.

Mr. Hart referred to the organization of two seed centres in his county, one producing autumn wheat and the other oats. He referred especially to the value of the co-operative idea embodied in the seed centre scheme, as he was firmly convinced that where a grower works independently, he usually does so at considerable disadvantage. Working singly, a grower has difficulty in working up a large and satisfactory trade. Working in co-operation with others however would, in his opinion, solve many of the problems with which the independent grower is confronted. Formerly the main problem had been that of production but now the question of greatest concern seemed to be that of selling to best advantage. In his work as District Representative, he

had found that a great deal of educational work had produced little effect because of the fact that farmers had not been helped in disposing of their product. In the Seed Centre scheme one of the most important features is the providing of a definite plan to work on. This County claimed the honour of being the home of the Dawson's Golden Chaff wheat, it having been orginated by a Mr. Dawson residing in the County. They are therefore specializing on seed of this variety and hoped in the very near future to be able to supply a greater quantity of first class registered seed. This County, moreover, was practically free from the more serious weeds and for this reason among others was especially suited to the work of seed growing. Farmers with whom this question had been discussed, took readily to the scheme and in accordance with his recommendations had purchased good pure registered seed as foundation stock, with which to start. Personally Mr. Hart believed that this scheme would revolutionize the whole work of seed growing and would be a great boon to those who had to purchase seed either in a small way or in car-load lots.

SEED GROWING CENTRES IN BRANT COUNTY.

Mr. R. Schuyler, Paris, Ontario, District Representative of Agriculture for Brant County, reported on the progress which had been made in the organization of seed centres in his County. As District Representative of Agriculture he was always on the alert to discover or devise schemes which would be in the interests of his farmer constituents and it had occurred to him that the idea embodied in the seed centre plan was one which farmers would readily take to. In his County there were districts which seemed pre-eminently suited to the production of first class seed barley and oats and he therefore decided to specialize with those crops. Meetings were called in the districts mentioned and the whole plan submitted to the farmers present with the result that a barley centre was organized at Onondaga and a Banner oat centre at Falkland. At first he was afraid that too many growers were going into this work as the great majority of those with whom the matter was discussed seemed anxious to participate in it. When he considered however the large quantities of seed which were required every year together with the fact that a large percentage of the lots offered for sale would not be able to reach the high standards set for registered seed, he recognized that his fears were unfounded. Mr. Schuyler hoped to have three good strong seed-growing centres established this spring.

Mr. H. M. King, of Cayuga, Ont., District Representative of Agriculture for Haldimand County, gave an excellent address on the growing of Alfalfa seed, and drew attention to the progress which had been made in his county in the organization of an alfalfa seed growing centre. Mr. King's address is given below in full.

The Work of the C.S.G.A. in Haldimand County with special reference to Alfalfa.

(By H. M. King, Cayuga, Ont.)

Before dealing more directly with Seed Centres in Haldimand County, I wish to make a few general remarks regarding alfalfa, dealing more particularly with the Lake Erie Counties, and thus work up to the reason or justification for organizing for the production and sale of hardier strains of Alfalfa seed.

Though now fairly widely scattered over older Ontario, Alfalfa is grown more particularly in the southwestern part of the Province. The production of Alfalfa Seed in Ontario is practically limited to this area, and of this restricted area Haldimand County is in the first rank as a producer of Alfalfa Seed.

The soil of our County is largely of a heavy nature, and mostly clay. We have some light soil, but Alfalfa production is not attempted on this. The fact that we have a clay soil with, in most parts, a warm bottom, is the reason for the length of time that good Alfalfa stands can be maintained in Haldimand County.

The average age of our Alfalfa fields is between 10 and 12 years, but there are stands from which hay and seed have been taken for nearly 20 years, and they are still yielding returns.

Profitable seed production is only practicable where we have gently sloping clay hills. On the lighter sandy soils or loams, or soils with a gravelly bottom, the seed does not set nearly so well. On these soils there is also greater danger of attack from grasshoppers Our native grasshopper is the greatest enemy of the Alfalfa Seed producer. If we could only devise some means of completely annihiliating the grasshopper, the amount of Alfalfa seed produced in Haldimand would be more that trebled. Frosts do not bother us so very much, but in odd years tend to lower the quality of our seed. Canadian blue grass is another of the enemies of Alfalfa. It is practically our natural field grass. It grows in nearly all crops. Red clover is very often crowded out by it. Alfalfa is about the only crop that can successfully maintain itself for any length of time, and wherever the Alfalfa is destroyed, there blue grass flourishes.

Our system of cropping varies with the season and the grower. Hay is usually the first crop. The seed is taken from the second crop as a rule. In some cases the first crop is left for seed, but the seed does not set so well, as bees are not so plentiful at blossoming time, and the ripening is more uneven. Alfalfa is pastured to a considerable extent in Haldimand, particularly during dry autumns, when the ground is fairly hard, and does not cut up with the tramping of cattle. Sheep and horses are pastured only where the stand is to be ploughed up in the spring.

Regarding amount of seed sown per acre, this varies from about 9 to 29 pounds, the average being about 15. One of our largest seed producers in the Grand River Circle obtained his heaviest yield of seed from a stand obtained by sowing 9 pounds of seed per acre. Where seed is to be harvested, the amount sown is always lessened. The yield of seed varies from about one half to six or seven bushels per acre, with an average good crop yielding about two bushels.

The farmers of Ontario are, I might say, "hungry" for a strain of Alfalfa seed that will withstand our climatic conditions. If Alfalfa is being introduced into a neighbourhood for the first time, it is important that a hardy strain be secured. If tender strains of imported seed are used and failure results, it is a serious setback to Alfalfa growing in that district. The people of Haldimand knew they had a hardy strain of Alfalfa, because very rarely does it winter-kill. They knew that the people of Ontario wanted hardy seed, but they lacked organization, and thus they lacked a selling medium. These were the conditions when I was appointed Agricultural Representative to Haldimand last June. Many beautiful fields of Alfalfa were visited, and as the crop of seed looked promising, the problem was, where are we going to market our seed so that its real value can be demonstrated, and where can we obtain a larger market?

Naturally enough we turned to the Canadian Seed Growers' Association. A meeting was called, and Mr. Newman very ably outlined the methods of obtaining Registered Seed and the handling of the Seed plot. The result

was the organization of the "Grand River Alfalfa Seed Centre". Our slogan is "Better, hardier Alfalfa and more of it". The real object of the circle is to produce Registered Grimm's Variegated Alfalfa seed. Prof. Zavitz has obtained the seed for us, and is cleaning it. This will be sown on our prepared plots next year, mostly in rows to be cultivated, but you will understand that it will be a few years before we will have a quantity of this seed for sale. As the seed costs nearly a dollar a pound, the members are taking only a few pounds each, and this will have to multiply. Since it is going to be some time before we have Grimm seed for sale, it will be asked, what is being done in the meantime? Simply this: the Circle is selling throughout Canada its Home Grown Seed without the use of a seed merchant or middlemen. The Society is strictly Co-operative. The number of bushels of seed for sale was estimated at the beginning of the season, and the Secretary is booking orders, not for any one man, but for the Society. They have grasped the real principle of Co-operation, and are being repaid. The number of members for this season has been limited to twelve, but this will likely be increased another year. The seed is sold on its official grading, Number Three seed not being handled. They are looking to the future and a good reputation, and are adopting the proper method.

You will understand from what I have said that we are only started in our campaign for producing hardier strains of Alfalfa seed in Haldimand. But we are not satisfied yet. Before another year we hope to have several similar organizations in the County, and the chances look good. Only this week two orders were booked for seed, one for 22 bushels and another for 25, the latter from one of the leading seed houses of Ontario. A number of seed growers have applied for admission since the membership was limited, but as they were not willing to take the chance at first, they will have to wait till another year.

The C.S.G.A. work in Haldimand County has given a new lease of life to the Alfalfa industry. The organization of our one society has given us a market as wide as Canada. Our seed is practically all contracted for now, before some of it has been threshed. Naturally then, we are all optimistic as to the result. Another year will, I am sure, see a number of societies similar to the Grand River one in Haldimand. Nowhere in Ontario can Alfalfa seed be produced more satisfactorily, and nowhere is greater interest being taken in its production and sale. And the bulk of the credit is due to the efforts of the officers of the C.S.G.A. in helping us to organize; helping us select hardy strains; helping us grade our seed; and most of all in helping us to help ourselves to a large Canadian market. The work is bound to proceed.

The CHAIRMAN: "There are possibilities which we do not realize in the production of Alfalfa seed. Last autumn I was speaking with Prof. Smith, of the Department of Agriculture at Washington, who stated that the Niagara peninsula was the best section he knew of in America east of the Mississippi River for the production of Alfalfa seed. Speaking of 'variegated' clover Prof. Smith said that he never referred to a strain as being 'variegated' unless more than fifty per cent of the plants were truly variegated."

The Seed Corn Centre as a Factor in the Production of Registered Seed in Commercial Quantities.

(By Mr. T. J. Shepley, of Amhertsburg, Ont.)

"I venture to say that I owe the honour of being invited to speak to-night to the fact that I am Secretary of the Riverfront Seed Corn Centre, and before I sit down I hope to tell you something about that organization.

While we know that corn is the most superb plant that grows, the unquestioned king of all grains, we must also admit that its propagation is hedged about with more difficulties than is the case with any of the other cereals. But let me add that these difficulties are not insurmountable.

It has ever been a habit of ours when starting out in pursuit of anything to consider the achievement of that purpose, not only a possibility, but almost a dead certainty. Not but that we fail sometimes, but we are always ready to try again. If you never have failed its an even guess you never have won a great success.

We believe that the successful farmer of to-day must be more than ever an up to date, wide awake man. In these days of keen competition, when labour is scarce, that farmer alone is successful who not only uses his muscle, his strong right arm, but his brain as well. We know that nearly all of the improvement, the advancement that has been made in corn breeding in Canada to date has been done through either The Canadian Seed Growers' Association or the Ontario Corn Growers' Association. The Canadian Seed Growers' Association by the ear-to-the-row method and by the kindness and courtesy of the Secretary, the Inspectors and the Officials in the assistance we receive from them; the Ontario Corn Growers' Association by its Annual Corn Show, and its numerous and successful School Fairs.

The ear-to-the-row method, excellent as it seemed to be at the time of its inception, excellent as has been the work done by some of its members bids fair unless properly restricted, to defeat the very end for which it was introduced.

Every member, I take it, has an ideal ear in his mind to which he breeds. Those ideal ears do not conform to one type, and so we have many and various types in the one variety. In my humble opinion a remedy for this could easily be found in the standardization of the different varieties. This could best be accomplished by the establishment of an experiment station for corn in one of the great Corn Counties in Southern Ontario. Put at this station the best corn men that money can find, let him get in touch with the men who make a specialty of Corn Breeding and together they could easily fix a standard for the different varieties of corn we have. If we had an experiment station with a competent man on it and if our Corn Counties were formed into Seed Corn Counties we would be able to walk where heretofore we have been groping blindly; we would be able to accomplish something.

As I conceive it, the function of a Seed Corn Centre should be the production, curing and dissemination of high class or better still, "Registered" Seed Corn.

For such an object as this "The Riverfront Seed Corn Growers' Centre" was organized. We have a President, a Secretary and Treasurer. We occupy a tier of lots fronting on the Detroit River and grow only "The famous Wisconsin No. 7." One of the conditions of membership is that first you must be a member of the Canadian Seed Growers' Association.

The product of one seed plot of Corn in 1913 has been registered and will be utilized as far as possible for seed for members of the Club in 1914. In this way we hope to produce registered Corn by the carload in 1914. Next year we propose instead of requiring each member of the Club to raise a seed plot of at least 20 rows x 50 hills as at present, to let one man grow a larger seed plot say one acre following the ear-to-the-row method, the other members of the Club buying their seed from him. We believe that corn breeding could be carried on more successfully and to better advantage on a large seed plot than on a small one. The danger of inbreeding would also be further removed. We would have only one type of corn in one centre and the man from the experiment station could help with his advice and encouragement in the operating of the large seed plot to much better advantage than he could where many small ones had to be considered.

After having produced our corn, we must insure a strong vitality by curing it properly. After trying several methods we have chosen "The Rack" as shown in our miniature seed house in our exhibit, as the *best*. Germination tests made from corn cured on our racks in 1913 showed a germination of one hundred per cent. We have cured our 1913 product on racks of this sort and we feel sure that we have the real goods to offer the corn growing public in 1914. Now, sir, if we are to be successful corn breeders not only must we breed it right, not only must we cure it properly, but we must sell it right. I have had a little experience in corn breeding and as I have operated my seed plots I have often thought of the words of our honored President: "A farmer at his best is a partner of God Almighty, in the production of a high class product from the seed, the soil and the atmospheric conditions." Yet if we are to stay in the business we must have a fair remuneration for our efforts, we must be paid a fair price for our labour, for it is by this craft we have our living. I noticed a short time ago an article in the *Toronto Sun* from that very versatile writer, whose nom de plume is *Vim*, a few suggestions about growing Seed Corn for profit. If my memory serves me right he spoke of growing 100 bushels or better to the acre and selling it for $1.50 per bushel. Gentlemen, take it from me that condition of affairs never happens. On the River Front in Malden we have cured for the trade some 550 bushels of corn. That corn was selected from some 50 or 60 acres of the best corn land in the grand old Province of Ontario. In order to get the *best* seed corn it must be selected carefully when husking, and then when we come to ship, we expect to select again.

You all know where the price of pork is, and sir, it looks as if it was going to stay. In the the land where I come from there is and old saying that when pork is $5 per cwt. it pays to buy corn at $1 a bushel and feed it to the hogs.

I am very sure the select ears we are offering for sale for seed are worth more for feed than ordinary Crib-Cured Corn, so we think if we sell it for less than $3 per bushel we are selling at a loss. We propose to put a good article on the market, we ask a good price for it. I ask you, gentlemen, is the proposition not a fair one, does it not seem reasonable?

Mr. ABRAHAM: It has been my endeavour to promote an interest in corn work in Kent County in connection with the School Fairs. In one section I asked the boys and girls if they cared to operate a seed corn plot on their own farms, the Department to supply the seed. I received an answer in the affirmative from two hundred. Each of these planted an eighth-acre plot which had to be isolated from other varieties in order to avoid cross-fertilization. Twenty prizes were offered for the best work performed. Those to whom these twenty prizes were awarded produced an average of over 90 bushels of corn per acre. The seed used was obtained from Mr. T. J. Shepley of Amhertsburg, Ont., and was an excellent type.

Mr. A. S. MAYNARD: The District in which I live (Chatham) is, in my opinion, one of the best districts in Ontario for the production of high-class North Dakota White Flint corn. After the last annual meeting of this Association I went home enthused for better seed. I tried to get a number of neighbours to take up the growing of seed of this variety and gave to each of twelve of these twenty ears of corn to start a seed plot. I regret to have to report, however, that not one of these applied for membership.

A MEMBER: Until recent years very little care was taken in the purchasing of seed corn. Now, however, practically every up-to-date corn grower demands only the best tested seed corn available and is not afraid to pay $3 per bushel for it.

Mr. DUKE: What is the average yield of Alfalfa seed per acre?

Mr. KING: A fair yield is two bushels of seed, but growers are usually well satisfied if they obtain one and one-half bushels. I have known of yields of from five to six bushels being realized.

Mr. DUKE: In Colorado and throughout the central West, they obtain larger yields, but the seed is entirely unsuited to Ontario.

Mr. HUNTER: We find that Alfalfa seed grown in our own County of Lambton gave better results than that brought in from outside points.

Mr. RAYNOR: A gentleman who ordered and sowed foreign alfalfa seed but who did not have enough to sow the entire patch, sowed the remainder with Ontario Variegated, and in this way discovered the superior hardiness of the latter.

Mr. HUTCHINSON: In our district the variety of Alfalfa which we have been growing does not seem sufficiently hardy and we are waiting to obtain seed of a hardier strain before again trying to grow this crop.

In the growing of seed grain we strongly urge all growers to feed their horses with only ground feed in the spring in order to avoid the transportation of impurities. In a field sown with pure barley, I once found fifty-four oat plants in a radius of six feet, which had been distributed through lack of care in this respect.

Mr. A. GROH: I have learned by experience of the unreliable nature of the seed trade. At present one does not know what he is getting and I am glad to learn that steps are being taken to solve this difficulty by means of controlling seed centres where the source of supply may be carefully supervised.

Selection of Beans.

(By H. G. Schmidt, Madawaska, Ont.)

I was induced by the unreliability of the "Large Navy Bean," with which I had been working, to import from my old home in Northern Germany many years ago, the ancestor of the variety which I now call the "Extra Early Canadian Dwarf." During the 45 or 46 years that this has been cultivated in different soils and climates, the original type has changed materially. From the original importation I selected year after year, the best and most prolific plants and think that what I have now can scarcely be improved further. I have counted 50 pods on a plant 9 or 10 inches high. It has no runners. Of six different varieties, including the "Wonder," "Prize-taker," and the "Large Marrowfat" it showed the blossoms first. In a very favourable year, when I had planted well on in June—if I am not mistaken on the 11th—I picked a few ripe pods on August 20th.

The "Early Bonnechere" is a sport from the above. The "Earliest Cross Lake" is a sport from the "Early Bonnechere," but has no runners. The "Yellow Marrow" is a cross between the "E.E C. Dwarf" and the "Californian Pea" but it is more prolific and earlier than the latter. The other marrows most probably have in them the blood of the large Marrowfat and the Red-eye China which I cultivated for a couple of years.

Gleanings from Field Work among Members of the Canadian Seed Growers' Association.

Mr. W. J. W. LENNOX, Representative of the Dominion Seed Branch in Western Ontario, reported on the progress of seed growing work in his District and referred to the organization of seed centres during the past year, expressing the hope that many more would be formed during the winter. He believed that greater enthusiasm was created where a number of men were working together than where a man works independently.

Speaking of the difficulties associated with this work, he said that growers must realize the importance of exercising the greatest possible care and precaution to have their seed pure in all respects.

During the year he had devoted a considerable time among the pea growers in the Bruce Peninsula and he was pleased with the reception and support extended by these farmers. He also commented upon the whole-hearted manner in which the District Representatives of Agriculture had taken up with the Seed Centre idea. He believed that the future of these orgainzations would depend very largely upon the attention given them by these officers.

Mr. T. G. RAYNOR, Representative of the Dominion Seed Branch in Eastern Ontario, thoroughly believed in the Seed Centre idea, but was of the opinion that it would be well to get a few centres started on a substantial basis first. Others would soon follow. He urged the great importance of exercising every possible care in the production and handling of seed intended for registration. During the past year he had given a great deal of attention to the growing of Red Clover and Alsike seed in New Ontario and referred to the fact that the District is eminently suited to the production of seed of these plants and he hoped to see one or two seed-growing centres established there very soon.

Mr. KEITH: I would like to assure the growers of Registered Seed that the firm to which I belong (Geo. Keith & Sons, Toronto, Ont.) can never obtain a sufficient quantity of real good seed. We find that farmers are more willing to pay higher prices for good seed than they formerly were. Formerly we used to send most of our No. 1 Clover seed out of the country, but this is not the case at present. Three years ago we started buying Registered Seed, and this year we are handling about three carloads.

A MEMBER: I have found it a very decided advantage to belong to the Association, and I heartily commend it to all who wish to realize the greatest returns for their time and labour.

THE CHAIRMAN: The watchword of this Association is Quality first and always. As the Resolutions Committee reports that it has no resolutions to bring before the meeting I declare this meeting adjourned

SEED GROWING IN WESTERN CANADA.

(By the Secretary.)

The progress of the work of the Association throughout the Western Provinces has been fairly satisfactory during the past season. In these Provinces, as well as in the other Provinces of Canada, the officers of the Provincial Departments of Agriculture are commencing to take the lead in promoting this work in suitable districts within their respective borders, so that we may confidently expect to see the whole work advance more rapidly than heretofore. In the past

the work has not advanced in the West as rapidly as it should, owing very largely to the extensive system of farming which is practised. Since the Provincial authorities, however, have come to appreciate more fully the financial opportunities connected with the growing of Registered Seed, and have become aware of the fact that a certain interprovincial trade is almost inevitable, they are taking the initiative in securing new and desirable members and are planning to give them every encouragement.

The exhibitions of selected seed grain by members in the three Prairie Provinces have not proven especially creditable so far, although, with the direct attention which the Provincial Departments will henceforth give to the work, it is to be hoped that a better showing will be made in the future.

No special meetings of members in the different Provinces were arranged for during the Season, this being the first year that these have been omitted. It is expected, however, that the Provincial Fair authorities in each of the three Provinces will arrange to continue these meetings in future as they are an exceedingly useful means of bringing members together for the purpose of discussing matters pertaining to the work of the Association in general and of comparing successes and failures in connection with their individual operations.

How I produced the World's First Prize Hard Wheat.

(*By Paul Gerlach, Allan, Sask.*).

It will interest every farmer to know how the World's Prize Wheat of 1913 was produced. I was asked, "To what do you attribute your success in growing such wheat?" I replied "To good seed and to feeding the plants well." How the seed was originally secured, later improved and finally how the soil was tilled, I will relate.

Marquis is a cross-bred wheat, having been produced by crossing Red Fife with Hard Red Calcutta and the product carefully selected under the guidance of Dr. Saunders, at Ottawa. The advantage Marquis possesses over Red Fife is about eight to ten days earlier maturity, and about six bushels more per acre. The straw is very strong, of medium length and the bald heads well chaffed. As to milling value, it is fully equal to Red Fife. Now that Marquis has thrice in succession won the World's Championship, there can be no doubt as to its superiority.

I came from Detroit, Mich., seven years ago and located on a homestead eight miles south of Allan. I learned after a few year's farming that there was some danger of a possible early frost damaging the wheat, particularly if grown on heavy soil and sown late. I noticed an article in a farm journal telling of the qualities of Marquis. I sent for five pounds, the quantity allowed each farmer, and persuaded a few friends to secure an equal amount and pass the same on to me. In that manner I received 15 pounds, which I sowed on breaking. The product I threshed with a flail to assure purity. The next year I sowed the wheat on summer fallow, and during the growing season I culled out bearded heads, and other grains; also any stray noxious weeds. This plan I followed each succeeding year, using great care in threshing to avoid mixing.

My 1911 crop was particularly fine, and a sample shown at the Provincial Seed Fair secured the Championship, scoring 96 points, weighing 66½ pounds, ranking highest in purity and second in milling value in its class.

The next year my exhibit at the same Fair was awarded second prize, scoring 94½ points, ranking first in purity and milling value.

After winning the Provincial championship, I wrote to Dr. Saunders asking him for a small amount of superior strain of Marquis, if he had one, as I wished to get the best available. I also told him what I had done and the result. His

Mr. Paul Gerlach, Allan, Sask., winner of the world's prize for the best 100 pounds of hard Spring Wheat grown in 1913.

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reply was to select from my own as there was no better to be obtained. I then selected a bushel of the choicest kernels which were sown in our garden. After the plants were headed out I carefully culled out all plants not to my fancy. I did this at least a dozen times. The product of this plot, I recleaned and sowed on summer-tilled soil, and again the culling process was resorted to. I can assure you I felt a thrill of joy as I rode the binder while cutting this field. The straw had just a tinge of green, and the grains were quite firm. I had sown a bushel to the acre and the yield was 37 per acre.

It became evident that I could not get a machine to thresh my crop very early, so I hauled several loads of sheaves into the barn, the remainder being left in the stook or stack. It was the wheat stored in the barn that won at Tulsa, Okla., weighing slightly over 71 pounds to the bushel, which I understand is a world's record.

The other wheat was threshed late, causing a loss of several bushels per acre and a somewhat bleached sample which, however, would not impair its value for seed.

I am still further improving my wheat by hand selection. While culling over the small field above mentioned, I noticed some plants showing a superiority over the others, the heads were nearly square and filled from end to end with large kernels. I spent three days selecting a sack full of these heads which I threshed in a bag to avoid any possible mixture. Last spring I sowed this seed in the garden and after the plants were headed out I weeded out any heads not true to the type I desired. As soon as the grain was ripe, I selected a sack full of heads conforming to my ideal. These will be threshed and sown next year (1914). I shall continue improving my wheat if such is possible.

Now, as to how I till the soil. My main effort is to conserve moisture. In this I try to follow the Campbell system of soil culture (Campbell Soil Culture Co., Lincoln, Neb.). Our soil is a moderately heavy chocolate clay loam, and works up nicely if done at the proper time. In preparing summer fallow, I prefer starting the year before, by following the binder with a disc harrow, discing the stubble as soon as the grain is cut, keeping far enough away from the standing grain to permit the large wheel of the binder to travel on solid ground. As long as the straw is standing it acts as a blanket on the earth, preventing evaporation to a large extent. As soon as the straw is removed, the protection is gone, the sun and wind soon dry out the surface. By discing as stated, I gain in various ways.

First: I break up the capillarity of the surface soil to prevent the loss of moisture through evaporation.

Secondly: The soil is in splendid shape to receive a rain and to permit the water to enter the soil quickly and to escape through evaporation very slowly.

Thirdly: By thoroughly mixing stubble, weeds, roots, straw, etc., with the soil, the surface two inches or more, when turned under with the plough, will produce a fine root bed, whereas, if all this material were left, as is often the case on most farms, without discing, the dry earth, stubble, etc., would be turned under all in one mass, causing an open dry condition which must be an inhospitable home for the roots of the plants. Water from below the depth of the furrow cannot reach the roots, neither can the roots reach the water. As soon as the moisture in the surface soil is exhausted, the plants suffer.

Fourthly: By covering weed seeds at this time, many will be started to grow and freeze during the winter. Those that do not die or those that fail to grow during the autumn, will grow early the next spring and are then cared for.

I do not recommend burning stubble, unless there is too much to disc under. In cases where a large amount of stubble is present, and noxious weeds as well, I would certainly resort to burning. I desire to put back into the land as much humus as I can. By destroying the stubble by fire, you do not improve your soil.

After seeding is finished, I disc the land to be summer-tilled. This will kill many weeds and cause others to grow. It also opens the soil to receive and retain the rains. As soon as the weeds have started growing I begin ploughing. I turn a furrow of about six inches and shall go a little deeper each year until a sufficient depth is reached. I follow with a packer every half day. This I consider important, as the soil is then in splendid shape to be packed, it is soft and pliable, air spaces are crowded out, capillarity is re-established and plant food is being manufactured. I harrow each day's ploughing before night to conserve what moisture I have. After each rain that settles the mulch sufficiently to permit the capillary movement of the water to the surface I go over the field with the Acme harrow; this kills weeds and produces a perfect mulch. I desire to keep the soil as black as possible during the season. If weeds are allowed to grow, they take away the moisture intended for the wheat.

On the field that produced the wheat shown at Tulsa I sowed one bushel per acre to a depth of three inches, well into the moist soil and just below the mulch. I do not recommend that amount on all soils or under all conditions. The seed was treated with formalin by means of an immersion machine. After drilling, the ground was packed with a corrugated packer; this pressed the soil particles close to the grains bringing moisture to them, resulting in an even germination. By firming the surface the moisture was brought from the lower into the upper soil, causing any weed seeds that were near the surface to grow. These were harrowed out just as the wheat emerged above the ground. I use a lever harrow with the teeth set at an angle of about 45 degrees. When the wheat had attained the height of about 4 inches a rain fell which settled the mulch and the day following we again harrowed the field, getting rid of many weeds and re-establishing the mulch to conserve moisture and allow a more perfect circulation of air in the soil. There was nothing further done until the heads were visible. I then hired a man and it became his duty to cull out any plants not true to type, other grains and noxious weeds, I do this with all my fields.

I am convinced if farmers understood the controlling of moisture and the manufacture of plant food better, there would be less crop failures. Let me draw a simile: Suppose I were to live entirely on broth, I would place a vessel containing water on the fire and in it a quantity of meat preferably cut into small pieces. The chemical change now taking place in the water would be caused by heat. The heated water extracts the nutriment from the meat. The longer the extracting process goes on the stronger becomes the broth, and the less of it I would require to satisfy my bodily need. A small amount of the concentrated broth would be as nourishing as a large amount of the weaker.

Let me see how this simile applies to soil culture and plant growth. If I mix the stubble, straw, manure, etc., with the surface soil, then turn it into the bottom of the furrow and pack it down well, I crowd out all air spaces and bring moisture to the material I turned under, which causes it to decay, forming plant food. By harrowing after each rain of any consequence I prevent the escape of moisture. By ploughing early in the season (for summer fallow) I have my food factory at work a long time, and under the effect of the heat caused by the summer's sun, a large amount of plant food is extracted from the material ploughed down, or from the soil particles, and held in soluble form which is the only form by which plants can partake of the food. The richer the food, the less each plant requires. I tilled the soil which produced the prize wheat as nearly as possible along the lines I have indicated, and by sowing only a bushel to the acre did not crowd the plants. Each had a full supply of rich food; the result was the world's best and heaviest wheat—over 71 pounds to the bushel. The 1911 prize wheat weighed 65, the 1912, 64.

I was greatly pleased to hear the wheat had won, but I have greater pride in the knowledge that the seed that produced the wheat had been brought to


Irish Cobbler Potatoes
Produce of 1 root grown
under CSGA rules by
W.E. Turner. Duval, Sask

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Hand selected seed plot of Irish Cobbler Potatoes. Grown by W. E. Turner, Duval, Sask.

such a state of perfection on our own farm, after years of pains-taking effort, under the joint care of my wife and myself. I give full credit to her for her share.

Now a word regarding the Rumley Company's separator I won. The machine will be very useful to me and my neighbours. It has been very difficult, and at times impossible to get a machine as early as we wished it. No fall ploughing was done, considerable grain was lost through shelling and the quality suffered through exposure.

I wish to thank the Rumley Company for presenting so valuable a prize to the Dry Farming Congress, to be competed for by the farmers of the world. Such prizes do much towards stimulating good farming and careful seed selection. Considerable publicity is given the district that produced the wheat, and the advertising the firm gets, they richly deserve.

The Importance of Selecting Seed Potatoes.

(By W. E. Turner, Duval, Sask.)

I commenced during the fall of 1909, when harvesting my Irish Cobbler potatoes, to select the best roots for planting the next year, by digging carefully and keeping each root separate. I then went over the plot and picked out the most productive roots of uniform quality. These I stored in a large box in the cellar, to be planted in the spring of 1910 as a special seed plot. I selected again from this special seed plot in the fall of 1910 in the same manner, but during the summer of 1911 I saw the Annual Report of the Canadian Seed Growers' Association, and I found that the Association had a much better system of selection, so I sent for full particulars and rules, and when digging in the fall of 1911, selected 22 of the most productive roots and stored each root separately in compartments in boxes. In the spring of 1912 I selected a piece of land that was uniform throughout, using no manure, and planted whole, eight of the best potatoes of each of these roots in a separate row, numbering each row. Of course I expected to find some improvement, but I had no idea the improvement would be so great. When harvesting (1912) I kept each row and root separate, and then, by counting the potatoes, found the most productive rows. The best row had an average of 21 potatoes per root, the worst row only 13 per root. This is where the advantage of planting the product of each root in a separate row is found—one can see which row has the best record. In this Special Seed Plot there were 8 roots, with 25 or more potatoes per root; one root had 29. I selected again 27 of the best roots from the most productive row, keeping each root separate as before, and the remainder of the produce of the plot was put in a special bin for the multiplying field of 1913.

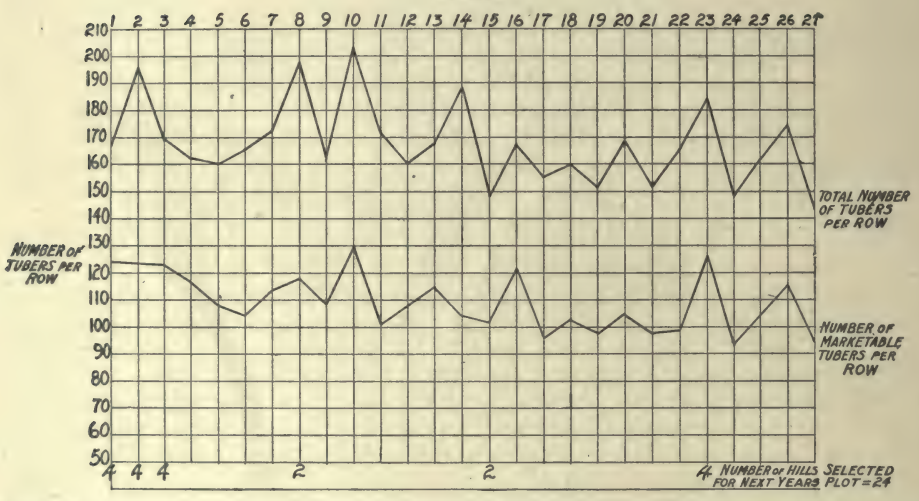
The Special Seed Plot of 27 rows was planted as before, 8 best potatoes planted whole per row, on land that had been cropped five times since being broken. I sprinkled a quart of hen manure around each root just as they were coming through the surface, and although the season was too dry for best results, the most productive row averaged 25 potatoes per root and the worst row 18 per root. In this special Seed Plot there were 35 roots with 25 or more potatoes per root one root having 40. Although the season was not as good as 1912 for high production, this shows an improvement on the 1912 crop. Here again is shown the importance of pedigree, the three best rows being from the most productive row of 1912. I do not expect to make much more improvement, but by careful selection each year under the Canadian Seed Growers' Association rules, to keep the strain at least as good as it is now.

Seeing the good results on the Irish Cobbler, I have also commenced to select the Rochester Rose, Wee McGregor and Ashleaf Kidney potatoes on the same plan.

DIAGRAM SHOWING VARIATION IN YIELD OF INDIVIDUAL ROWS (8 HILLS PER ROW) OF POTATOES GROWN ON SPECIAL SEED PLOT IN 1913.

IRISH COBBLER.

(GROWN NEAR DUVAL, SASK., BY W. E. TURNER.)



NOTE.—Grown on black loam that had been broken 5 years; had never been manured, but 1 quart of hen manure was sprinkled around each plant just as they were coming through the surface.

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